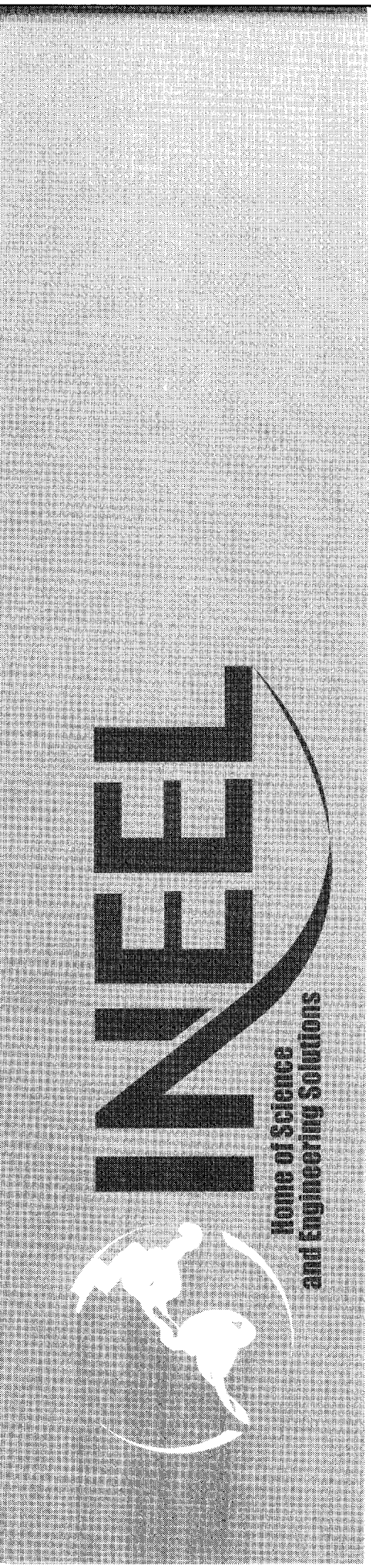

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Revision 1

April 2001

Health and Safety Plan for Operable Unit 5-12 Remedial Design/Remedial Action Projects

Kelly A. Wooley

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Health and Safety Plan for Operable Unit 5-12 Remedial Design/Remedial Action Projects

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4/12/01
Date

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4/12/01
Date

ABSTRACT

This health and safety plan establishes the procedures and requirements that will be used to eliminate or minimize health and safety risks to personnel working at Operable Unit 5-12 Remedial Design/Remedial Action projects, as required by the Occupational Safety and Health Administration standard and 29 Code of Federal Regulations 1910.120/1926.65, "Hazardous Waste Operations and Emergency Response." It contains information about the hazards involved in performing the work, as well as the specific actions and equipment that will be used to protect personnel while working at the task site

This health and safety plan is intended to give safety and health professionals the flexibility to establish and modify site safety and health procedures throughout the entire span of site operations based on existing and anticipated hazards. The body of this health and safety plan provides the core safety and health information for the Operable Unit 5-12 Remedial Design/Remedial Action work, with task-specific information for each separate activity provided in an appendix as designated in the table of contents.

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FIGURES

TABLES

ACRONYMS

ALARA	as low as reasonably achievable
Anti-C	anti-contamination
APR	air-purifying respirator
ARA	Auxiliary Reactor Area
ARDC	Administrative Record and Document Control
BBWI	Bechtel BWXT Idaho, LLC
CC	Construction Coordinator
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CNS	central nervous system
COC	contaminant of concern
CRC	contamination reduction corridor
CRZ	contamination reduction zone
DAC	derived air concentration
D&D	decontamination and dismantlement
D&D&D	decontamination, dismantlement, and decommissioning
dBA	decibel A-weighted
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EA	exposure assessment
EAM	Emergency Action Manager
EC	Emergency Coordinator
EPA	U.S. Environmental Protection Agency

ER	Environmental Restoration
ERO	Emergency Response Organization
ES&H/QA	Environment, Safety, and Health/Quality Assurance
EZ	exclusion zone
FD	fire department
FFA/CO	Federal Facility Agreement and Consent Order
FTL	Field Team Leader
FUM	Facilities, Utilities, and Maintenance
GI	gastrointestinal
GPRS	global positioning radiometric scanner
HASP	health and safety plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	high-efficiency particulate air
HQ	hazard quotient
HSO	Health and Safety Officer
ICDF	INEEL CERCLA Disposal Facility
ICS	Incident Command System
IDLH	immediately dangerous to life or health
IH	Industrial Hygienist/Industrial Hygiene
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
IRTL	Incident Response Team Leader
JRC	Job Requirements Checklist
JSS	Job-Site Supervisor
MCP	management control procedure

NEPA	National Environmental Policy Act
NIOSH	National Institute of Occupational Safety and Health
OMP	Occupational Medical Program
OSC	On-Scene Commander
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PBF	Power Burst Facility
PCB	polychlorinated biphenyl
PID	photoionization detector
PLN	plan
PM	Project Manager
PPE	personal protective equipment
PPM	parts per million
PRD	program requirements directive
PVA	polyvinyl alcohol
QAPjP	quality assurance project plan
RadCon	radiological control
RBA	radiological buffer area
RCT	Radiological Control Technician
RD/RA	remedial design/remedial action
RCRA	Resource Conservation and Recovery Act
RE	Radiological Engineer
RWMC	Radioactive Waste Management Complex
S&H/QA	safety & health/quality assurance
SAP	sampling and analysis plan

SCBA	self-contained breathing apparatus
SE	Safety Engineer
SMO	Sample Management Office
STL	Sampling Team Leader
SPERT	Special Power Excursion Reactor Test
STD	standard
SWP	safe work permit
SZ	support zone
TLV	threshold-limit value
TPR	technical procedure
TSCA	Toxic Substance Control Act
TWA	time-weighted average
VOC	volatile organic compound
VPP	Voluntary Protection Program
WAG	waste area group
WCC	Warning Communications Center
WERF	Waste Experimental Reduction Facility
WGS	Waste Generator Services

Health and Safety Plan for Operable Unit 5-12 Remedial Design/Remedial Action

1. INTRODUCTION

This Health and Safety Plan (HASP) establishes the procedures and requirements that will be used to eliminate and/or minimize health and safety risks to personnel working at the Operable Unit (OU) 5-12 Remedial Design/Remedial Action (RD/RA) project sites. This HASP meets the requirements of the Occupational Safety and Health Administration (OSHA) standard, 29 Code of Federal Regulations (CFR) 1910.120/1926.65, "Hazardous Waste Operations and Emergency Response (HAZWOPER)." Its preparation is consistent with information found in the National Institute of Occupational Safety and Health (NIOSH)/OSHA/United States Coast Guard/U.S. Environmental Protection Agency (EPA) *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH 1985); INEEL *Safety and Health Manuals;* and *Radiological Controls Manual* and *Radiation Protection Manual*. This HASP complies with the authorized safety basis detailed in the *Hazard Classification of Environmental Restoration Activities at the INEEL.*

This HASP governs all work at the OU 5-12 RD/RA project sites that is performed by employees of Bechtel BWXT Idaho, LLC (BBWI) and subcontractors to BBWI, and employees of other companies or the U.S. Department of Energy (DOE) laboratories. People not normally assigned to work at the site, such as representatives of DOE, the State of Idaho, OSHA, and the EPA are considered nonworkers who fall under the definition of "occasional site workers" as stated in OSHA 29 CFR 1910.120/1926.65.

This HASP will be reviewed and revised by the health and safety officer (HSO) in conjunction with the Field Team Leader (FTL), and/or necessary environmental, safety, and health professionals, and the BBWI Environmental Restoration (ER) Environmental, Safety, and Health/Quality Assurance (ES&H/QA) manager, or designee, to ensure the effectiveness and suitability of this HASP.

1.1 INEEL Site Description

The Idaho National Engineering and Environmental Laboratory (INEEL), formerly the National Reactor Testing Station, encompasses 2,305 km^2 (890 mi^2) and is located approximately 55 km (34 mi) west of Idaho Falls, Idaho (see Figure 1-1).

The United States Atomic Energy Commission, now the DOE, established the National Reactor Testing Station, now the INEEL, in 1949 as a site for building and testing a variety of nuclear facilities. The INEEL has also been the storage facility for transuranic radionuclides and radioactive low-level waste since 1952. At present, the INEEL supports the engineering and operations efforts of DOE and other federal agencies in areas of nuclear safety research, reactor development, reactor operations and training, nuclear defense materials production, waste management technology development, and energy technology and conservation programs. The Department of Energy Idaho Operations Office (DOE-ID) has responsibility for the INEEL and designates authority to operate the INEEL to government contractors. Bechtel BWXT Idaho, LLC, the current primary contractor for DOE-ID at the INEEL, provides managing and operating services to the majority of INEEL facilities.

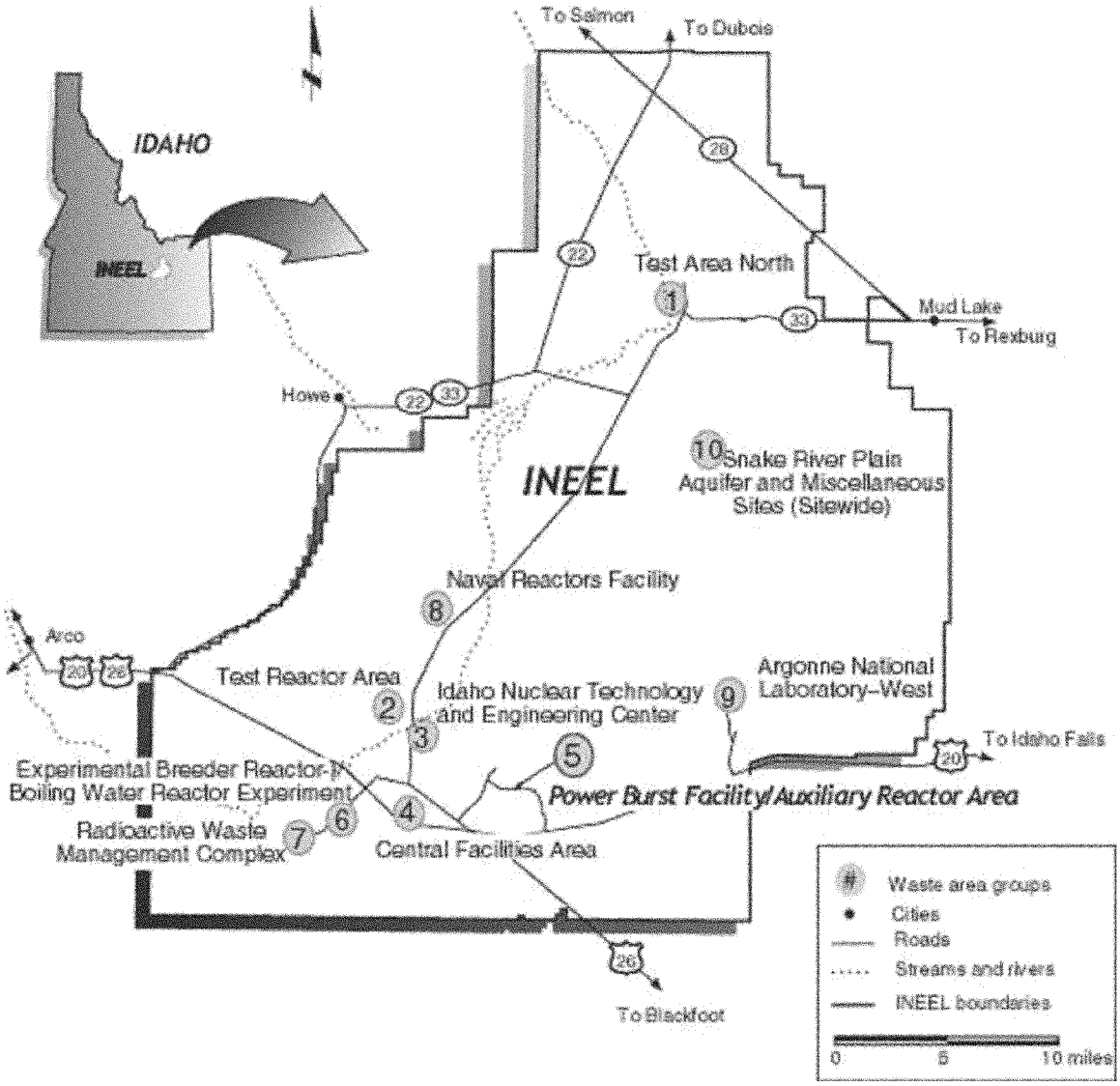

Figure 1-1. Map of the INEEL Site showing location of major facilities.

1.2 Site Description

Comprising the Auxiliary Reactor Area (ARA) and the Power Burst Facility (PBF), Waste Area Group (WAG) 5 is in the south-central portion of the INEEL. The INEEL is located in southeastern Idaho and occupies 2,305 km^2 (890 mi^2) in the northeastern region of the Snake River Plain (see Figure 1-1). The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 6901) identification number for the INEEL is 1000305. Land use at the INEEL is classified as industrial (DOE-ID 1996).

The ARA consists of four separate operational areas designated as ARA-I, ARA-II, ARA-III, and ARA-IV. Once known as the Special Power Excursion Reactor Test (SPERT) facilities, PBF consists of five separate operational areas: the PBF Control Area, the PBF Reactor Area (SPERT-I), the Waste Engineering Development Facility (SPERT-II), the Waste Experimental Reduction Facility (WERF) (SPERT-III), and the Mixed Waste Storage Facility (SPERT-IV). Collectively, the WERF, Waste Engineering Development Facility, and the Mixed Waste Storage Facility are known as the Waste Reduction Operations Complex.

As shown on Figure 1-1, ARA and PBF are located fairly close together. In addition to proximity, the two areas have similar operational backgrounds and sources of contamination. Therefore, ARA and PBF were consolidated into one waste area group for comprehensive evaluation (DOE-ID 1991). A synopsis of the history for each facility is given below.

1.2.1 Auxiliary Reactor Area

The ARA-I and ARA-II facilities were constructed in 1957. The ARA-I facility was built to support the Stationary Low-Power Reactor No. 1 (SL-1) located in the adjacent ARA-II facility and was the staging area for the emergency response to the 1961 SL-1 reactor accident and cleanup. The SL-1 reactor at ARA-II was operated intermittently from August 1958 until it was destroyed by a nuclear accident in January 1961 (Holdren, Filemyr, and Vetter 1995). Subsequent to decontamination following the SL-1 accident, activities at ARA-I included hot cell operations, materials research, and laboratory operations including sample preparation and inspection. The main buildings at ARA-II were converted to offices and welding shops. The ARA-II facility also housed numerous minor structures such as a guardhouse, a well house, a chlorination building, a decontamination and laydown building, a power extrapolation building, an electrical substation, and several storage tanks. The ARA-I and ARA-II facilities were formally shut down in 1988 and 1986, respectively. Decontamination and complete dismantlement were initiated in 1995 and are nearing completion.

Construction of the ARA-III facility was completed about 1959 to house the Army Gas Cooled Reactor Experiment research reactor. Experiments with the reactor continued until the plant was deactivated in 1961. In 1963, the ARA-III facility was modified to support the Mobile Low Power Reactor series of tests conducted at ARA-IV and remained active until late 1965 when the Army Reactor Program was phased out. In 1969, two buildings were constructed at ARA-III to provide additional laboratory and office space in support of other INEEL programs. The facility was shut down in 1989. Decontamination and complete dismantlement was initiated in 1990 and completed in 1999.

The ARA-IV facility was built to accommodate the Mobile Low Power Reactor 1, an active project from 1957 to 1964. The Nuclear Effects Reactor was operated at ARA-IV from 1967 to 1970. The area was closed down until 1975, at which time it was used temporarily for some welding qualification work. Decontamination and dismantlement were performed in 1984 and 1985. Since 1985, the area has been

used occasionally for testing explosives in powdered-metal manufacture experiments. A small control building, a bunker, the buried remains of two leach pits, and a sanitary waste system are all that remain.

1.2.2 Power Burst Facility

The PBF Control Area was originally built in the late 1950s for remote control of the SPERT experiments. As shown in Figure 1-2, the PBF Control Area is centrally located relative to the four SPERT facilities that surround it. The facility was greatly expanded for the PBF program, but its primary function as a support facility has not changed. The facility provides raw water storage and distribution, administrative offices, instrument and mechanical work areas, and data acquisition resources.

The SPERT-I reactor was operated from 1955 to 1964, decommissioned in 1964, and demolished in 1985. Remnants of the original SPERT-I facility, which consist of a small terminal building, a small instrument cell, some decomposing pavement, an abandoned seepage pit, and an old leach pond, remain in the vicinity. The PBF Reactor was constructed in 1972 just north of the remains of the SPERT-I facility. The PBF Reactor has been on standby since 1985. Other structures include a maintenance and storage building, cooling towers, two electrical substations, and numerous smaller buildings and structures.

The Waste Engineering Development Facility, originally built to contain the SPERT-II reactor, was constructed in the late 1950s. The SPERT-II reactor was operational from 1960 to 1964. After the reactor was removed, the facility was converted for research purposes. Current activities include waste treatment development and laboratory operations. A guardhouse is the only other building at the facility. An electrical substation, a leach pond, a seepage pit, and a couple of underground tanks are the only other structures. The area is also used for temporary storage of uncontaminated lead. The lead is stored outside in cargo containers stacked on asphalt pads.

The WERF building, originally constructed to contain the SPERT-III reactor, was constructed in the late 1950s. The SPERT-III reactor was operational from 1958 to 1968. The reactor building was decontaminated in 1980, and the building was modified to contain the WERF, which began operations in 1982. In addition to the WERF building, the facility contains a metal processing facility, a waste storage and handling building, an electrical substation, two exhaust stacks, and underground tanks.

The Mixed Waste Storage Facility originally housed the SPERT-IV reactor, which was operational from 1961 to 1970. After the reactor was removed, the building was modified slightly and converted to a waste storage facility. Mixed low-level waste, including radioactively contaminated polychlorinated biphenyl (PCB) waste, is stored in the former reactor pit. The facility also contains an electrical substation, a leach pond, and underground tanks.

1.3 Scope of Work

The Operable Unit 5-12 RD/RA is the culmination of all of the CERCLA evaluations performed for WAG 5. According to the *Federal Facility Agreement and Consent Order* (FFA/CO), the boundary of WAG 5 encompasses the facility locations presently or historically used within PBF and ARA, immediately adjacent areas where waste activities may have taken place, and all surface and subsurface areas. The boundary of the PBF area is well defined by a perimeter fence that surrounds the entire PBF complex. However, the ARA does not have a perimeter fence. Appendices to this HASP, specific to tasks performed in WAG 5 areas, will be included as these tasks are defined.

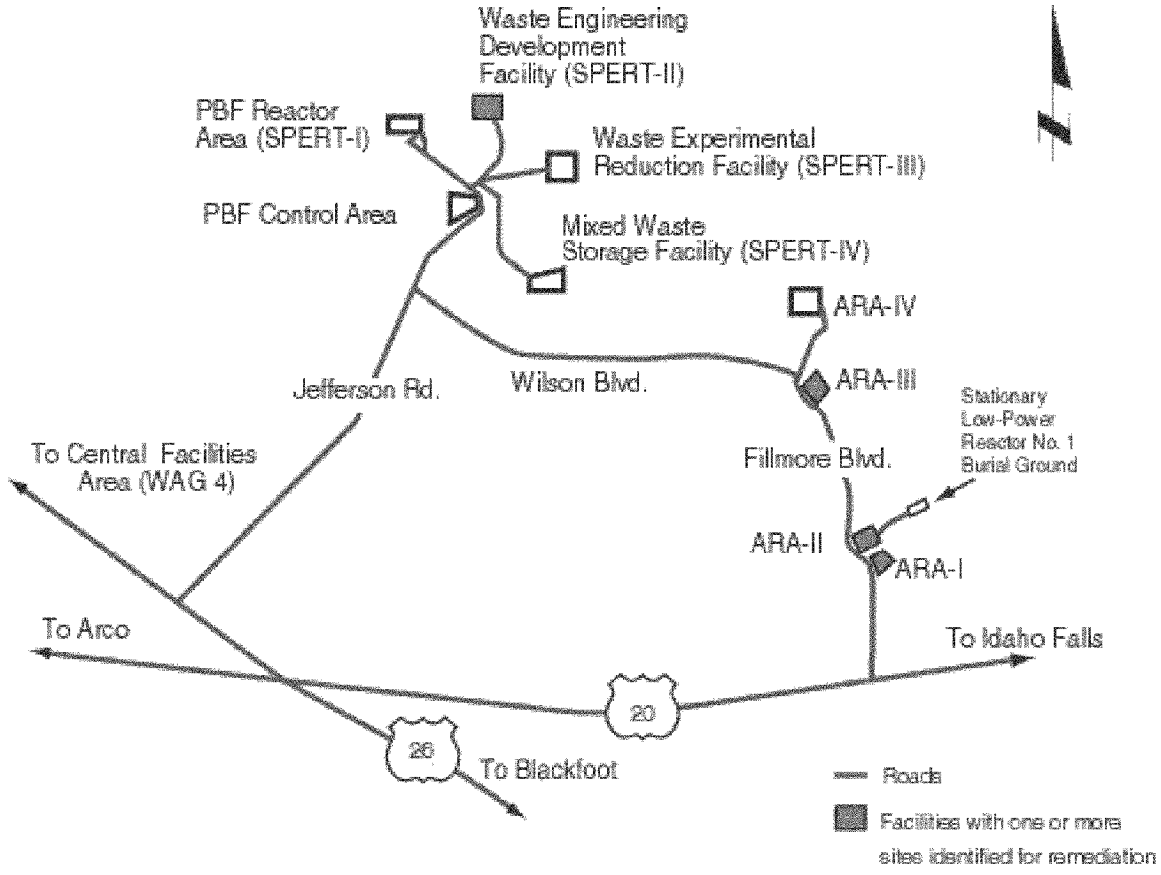

Figure 1-2. Map of WAG 5 physical configuration.

The selected remedy for WAG 5 comprises remedial actions that are protective of human health and the environment. Three actions will be implemented to mitigate the unacceptable risks to human or ecological receptors associated with the seven specific sites identified in the WAG 5 Comprehensive Remedial Investigation/Feasibility Study (Holdren et al. 1999) and Proposed Plan (DOE-ID 1999). As the specific remedial actions develop, appendices specific to each project will be incorporated into this Health and Safety Plan.

1.3.1 Contaminated Soil Sites

The first remedial action addresses the risk associated with a collection of five individual sites where contaminated soil is the only source medium (ARA-01, ARA-12, ARA-23, ARA-25, and PBF-16). The soil sites are contaminated with radionuclides and toxic metals. Unacceptable risk to human health or the environment from contaminated soil sites designated as ARA-01, ARA-12, ARA-23, ARA-25, and PBF-16 have been identified. The human health risk associated with ARA-12, ARA-23, and ARA-25 is primarily external exposure to ionizing radiation. Adverse effects to ecological receptors are associated with ARA-01, ARA-12, ARA-25, and PBF-16. Removing all soil that is contaminated with concentrations in excess of the remediation goals will mitigate these threats. The remediation of the soil sites will include the following activities:

- Soil with contaminant concentrations at or above the remediation goals will be removed using conventional earth-moving equipment (e.g., scrapers and backhoes).
- Areas that have been excavated to depths greater than 0.3 m (1 ft) will be backfilled with uncontaminated soil or sloped to promote drainage. All excavations will be contoured to match the surrounding terrain and vegetated.
- Contaminated soil will be characterized and sent to the INEEL CERCLA Disposal Facility (ICDF) or another location within the INEEL for permanent disposal.
- Existing institutional controls will be maintained until the selected remedy has been implemented at four of the five contaminated soil sites. Interim controls are not required for PBF-16, a site identified for remediation based on ecological risk from exposure to mercury. Institutional controls will not be required after remediation if all contaminated media are removed to basalt or if contaminant concentrations are comparable to local background values. Otherwise, postremediation institutional controls consisting of signs, access controls, and land-use restrictions will be established and maintained until discontinued, based on the results of a 5-year review.

1.3.1.1 ARA-01: ARA-1 Chemical Evaporation Pond. The ARA-01 site is a shallow, unlined surface impoundment, roughly 30 × 90 m (100 × 300 ft) in size, which was used to dispose of laboratory wastewater from the ARA-I Shop and Maintenance Building (ARA-627). Located southeast of ARA-I, the pond was constructed in 1970 by excavating soil to create a willow topographic depression. Basalt outcrops are present within and immediately adjacent to the pond. The subsurface immediately beneath the pond consists of fracture and rubble zones. No interbed was found within the first 36 m (118 ft).

From 1970 to 1988, the pond received process discharges that contained small quantities of radioactive substances, acids, bases, and volatile organic compounds. Since 1988, the pond has been dry except during spring runoff and heavy precipitation.

The ARA-01 Chemical Evaporation Pond will be remediated to address the risk to human and ecological receptors posed by contaminated soil. Samples collected in 1997 yielded concentrations of Am-241, Cs-137, Sr-90, U-235, Pu-238, Pu-239/-240, Ra-226, arsenic, lead, and thallium in excess of contaminant screening levels for human health, and concentrations of antimony, arsenic, cadmium, chromium, copper, lead, selenium, silver, thallium, vanadium, and zinc above screening levels for the ecological risk assessment.

1.3.1.2 ARA-12: ARA III Radioactive Waste Leach Pond. The ARA-12 site is an unlined surface impoundment with approximate dimensions of 115 × 50 m (370 × 150 ft). The pond was constructed in a natural depression west of ARA-III to dispose of low-level liquid waste from reactor research operations. Liquid waste was stored temporarily in tanks, then transferred to the leach pond via an underground pipe. Effluent contained low-level radioactive material. A second, separate discharge line originated in an uncontaminated water storage tank. The pond also received facility runoff through a culvert. The ARA-III facility was an active reactor research facility from about 1959 to 1965. From 1966 to 1987, activities at ARA-III were limited to component and instrumentation testing, instrumentation development and fabrication, and chemical research. Waste associated with these activities was not disposed of in the leach pond, and the only discharges to the pond during this period were from the water storage tank and facility runoff. The facility was shut down in 1987, leaving the pond dry except during spring runoff and heavy precipitation. In 1991, the culvert was plugged in preparation for decontamination and dismantlement (D&D) operations at ARA-III, and in 1993, the tanks and waste lines to the leach pond were removed.

Remedial action is required for the ARA-12 Radioactive Waste Leach Pond to address the risk to human and ecological receptors posed by contaminated soil. The ARA-12 site contaminants of concern for human health risks are from chromium, lead, manganese, Ag-108m, Am-241, Co-60, Cs-137, Pu-238, U-234, and U-238 and the ecological risks from arsenic, benzo(a)pyrene, cadmium, chromium, copper, lead, manganese, mercury, selenium, silver, and zinc (Holdren et al. 1999).

1.3.1.3 ARA-23: Radiologically Contaminated Soils at ARA-I and ARA-II. The ARA-23 site is a 17-ha (42-acre) windblown contamination area surrounding ARA-I and -II. The site also contains subsurface structures remaining after D&D within the ARA-I and ARA-II facilities. The 1961 SL-1 accident and subsequent cleanup radiologically contaminated the soil. Minor amounts of contamination may have been added by other ARA operations. Over time, winds dispersed the contamination over an area roughly 100 ha (240 acres) in size, but soil concentrations over most of the area are significantly less than risk-based remediation goals. The long axis of the roughly oval-shaped site is consistent with the generally southwest-to-southeast winds common at the INEEL.

Remedial action is required for the ARA-23 radiologically contaminated soils to address the risk to human health posed by contaminated soil. The ARA-23 site was retained for quantitative risk assessment in the Comprehensive Baseline Risk Assessment to evaluate the human health risk potential from Am-241, Cs-137, Ra-226, Sr-90, Th-230, and U-235 detected in the soil. The site was also retained for qualitative risk evaluation of Cs-137 data obtained with the global positioning radiometric scanner (GPRS). Because ARA-23 encompasses the ARA-I and ARA-II facilities and the SL-1 Burial Ground, 15 other sites (i.e., ARA-01, -02, -03, -04, -05, -06, -07, -08, -09, -10, -11, -16, -17, -19, and -25) fall within the boundaries of the windblown contamination area as originally defined. Several of these sites were retained for quantitative analysis in the Remedial Investigation/Baseline Risk Assessment (Holdren et al. 1999). Others were eliminated from further evaluation. However, residual soil contamination at these 15 sites was probably generated by the same sources as the ARA-23 contamination. Therefore, all residual soil contamination in ARA-23 not specifically addressed for another individual site will be addressed as part of the RD/RA with ARA-23.

1.3.1.4 ARA-25: ARA-I Soil Beneath the ARA-626 Hot Cells. The ARA-25 site comprises contaminated soil that was discovered beneath the ARA-626 hot cells during the D&D of the ARA-I facility in 1998. This portion of the soil remediation work will be performed in conjunction with the ARA-16 radionuclide tank work discussed in Section 1.3.2.3. The contamination was found near the hot cell floor drains. The contaminated area immediately around the drains measures approximately 2.4 × 3.7 m (8 × 12 ft). However, other isolated hot spots beneath the building were also discovered. Therefore, a cumulative size of 4.9 × 7.3 m (16 × 24 ft) was estimated for the site.

The ARA-I hot cells were constructed in 1959 and used until the facility was shut down in 1988. In addition to liquid radioactive waste such as wash water from the ARA-I hot cells, chemicals from materials testing and research and metal-etching processes were used at the facility. Stainless steel piping connected the floor drains to the ARA-729 Radionuclide Tank (Site ARA-16), which contains PCB-contaminated, Resource Conservation and Recovery Act (RCRA) F-listed mixed waste (40 CFR261, Subpart D) and transuranic radionuclides. The pipes are included in the remediation of Site ARA-16 and are not a component of the ARA-25 site.

Remedial action is required for the ARA-25 soil beneath the ARA-626 hot cells to address the risk to human and ecological receptors posed by contaminated soil. The analytical results showed concentrations of arsenic, lead, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Ra-226, and Sr-90 in excess of human health screening levels in the soil. Arsenic, chromium, cobalt, and copper were detected in concentrations above ecological screening levels.

1.3.1.5 PBF-16: SPERT-II Leach Pond. Remedial action is required for the PBF-16 SPERT-II Leach Pond to address the risk to ecological receptors posed by contaminated soil. Site investigations, the nature and extent of contamination, and a summary of site risks are presented below. More detailed information about the pond can be found in the WAG 5 Comprehensive Remedial Investigation/Feasibility Study report (Holdren et al. 1999).

The PBF-16 site is a fenced, unlined surface impoundment, with approximate dimensions of 70 × 51 m (230 × 167 ft), located south of the SPERT-II Reactor Building. From 1959 to 1964, the leach pond was used for disposal of demineralizer effluent, water softener waste, emergency shower drain water, and discharges from the floor drains from the reactor building. From 1964 until 1990, the only discharge to the pond was clean water from the PBF maintenance shop air compressor (Hillman-Mason et al. 1994). The compressor was removed in 1994 and no water has been discharged to the SPERT-II Leach Pond for several years (Gerber 1999).

The SPERT-II Leach Pond was screened from evaluation in the human health risk assessment (Holdren et al. 1999). Mercury was detected at 0.71 mg/kg and eliminated from evaluation based on comparison to the risk-based soil concentration of 23 mg/kg (EPA 1995). Though lead was detected at 32 mg/kg, risk could not be quantified because toxicity data for lead have not been developed. However, the maximum detected lead concentration is considerably less than the EPA 400-mg/kg screening level (EPA 1994). Therefore, lead was not identified as a contaminant of concern (COC) based on human health risk.

Mercury was identified as a COC for PBF-16 based on the results of the Ecological Risk Assessment (Holdren et al. 1999). The hazard quotients (HQs) for mercury range up to 50 for mammalian insectivores at PBF-16. Avian and mammalian herbivores have HQs that exceed 1.0, including an HQ of 10 for the pygmy rabbit. Because HQs that exceed 10 are associated with the site, remediation will be implemented to protect ecological receptors. A summary of the information about the COCs in soil at PBF-16 is given in Table 1-1.

Table 1-1. Soil concentrations for the contaminant of concern at PBF-16.

Contaminant of Concern	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Frequency of Detection	Background Concentration (mg/kg)	Exposure Point Concentration (mg/kg)	Statistical Measure
Mercury	ND[a]	0.71	ND	0.05[b]	0.71	Maximum

a. ND = not determined. Records of the 1983 sampling by decontamination and dismantlement personnel were not located. The maximum concentration was taken from the Track 2 report (Hillman-Mason et al. 1994).

b. The background value for composited samples is from Rood, Harris, and White (1996).

1.3.2 OU 5-12 RD/RA Tank System Remediation Projects

Three OU 5-12 RD/RA tank farm remediation projects are discussed below.

1.3.2.1 Septic Systems at ARA-07, ARA-08, ARA-13, and ARA-21. Remediation activities at ARA-07, ARA-08, ARA-13, and ARA-21 will involve the excavation and/or access to the top of the septic tanks, seepage pit, distribution box, manhole and a chlorination tank; the excavation and removal of the piping; and backfilling of the seepage pit. These septic systems served as sanitary waste systems at ARA-I/ARA-II, ARA-III, and ARA-IV.

ARA-07 consists of a seepage pit with an asphalt roof. The roof will be removed and the seepage pit walls excavated approximately two feet below land surface and the pit backfilled with clean soil. ARA-07 is located in a soil contamination area.

The ARA-08 work involves the removal of an estimated 3 feet of soil to expose the top of the seepage pit. The concrete tank cover will be removed and the inside of the tank backfilled with clean soil. ARA-08 is located in a soil contamination area.

The ARA-13 system is a 3,000-gallon sanitary sewer septic tank, manhole, and distribution box. The covers will be removed and if liquid is present, a sample will be collected for analysis. If the system is determined to be free of contamination or does not contain liquid, it will be left in place and backfilled. If contaminated, the components, including interconnecting piping, will be excavated and dispositioned, based upon waste determination from the sample results.

ARA-21 consists of a 1,000-gallon precast concrete septic tank, a 250-gallon precast concrete chlorine contact tank, approximately 75 feet of 4-inch sewer line, and a seepage pit. The septic tank and chlorination tank will be opened and a sample from any liquids will be collected for analysis. If the tanks are contaminated, they will be excavated and dispositioned based upon waste determination from the sample results. If the tanks are not contaminated, they will be left in place and backfilled. The leach pit will be uncovered of an estimated 4.5 feet of soil and backfilled.

1.3.2.2 ARA-02 Sanitary Septic System. The ARA-02 site is a sanitary septic system comprising three septic tanks in series, three manholes, a seepage pit, and the associated piping. The system was built in 1960 and serviced permanent and temporary ARA-I buildings until 1988 when ARA-I was inactivated. The ARA-02 septic system was designed and intended exclusively for sanitary waste. No known process waste was routed to the system, and no recorded spills or documented incidents were associated with the septic system. However, periodic surveys indicated radiological contamination. The source of the contamination is unknown.

The ARA-02 Sanitary Waste System will be remediated to mitigate excess human health risk. External exposure to radioactive contaminants is the primary exposure of concern. The entire system (i.e., three septic tanks, three manholes, a seepage pit, and piping) will be removed. However, the unacceptable risk is associated only with contaminants in residual dry sludge at the bottom of the seepage pit. Residual sludge in the seepage pit is the only waste present. The sludge is identified as mixed waste containing low levels of radionuclides and low concentrations of toxic metals and organics. The remediation of the Sanitary Waste System will include the following activities:

- The sludge in the seepage pit will be removed and sent for storage or treatment at a facility approved by Waste Generator Services (WGS).

- The components of the Sanitary Waste System (i.e., the seepage pit gravel and cinder blocks, manholes, three septic tanks, and pipes) will be excavated. The debris will be sent to a permitted disposal facility off the INEEL such as Envirocare in Clive, Utah, or an approved facility on the INEEL for final disposal. The debris will be decontaminated or encapsulated, only if necessary, to meet waste acceptance criteria for disposal.

- The excavated areas will be backfilled, contoured to match the surrounding terrain, and vegetated.

- Based on soil sampling results, soil contaminated with concentrations in excess of remediation goals is not expected. However, if such soil is identified by observation or by using field survey equipment during remediation of the Sanitary Waste System, the soil will be removed and disposed of at a facility off the INEEL, such as Envirocare, or an approved facility on the INEEL.

- Existing institutional controls will be maintained until the selected remedy has been implemented. Institutional controls will not be required after remediation if all contaminated media are removed to basalt or if contaminant concentrations are comparable to local background values. Otherwise, postremediation institutional controls consisting of signs, access controls, and land-use restrictions will be established and maintained until discontinued (time based on the results of a 5-year review).

1.3.2.3 ARA-16 Radionuclide Tank. The ARA-16 site is a 3,785-L (1,000-gal) stainless steel underground holding tank resting within a lidless concrete vault and covered by approximately 1.1 m (3.5 ft) of soil. From 1959 to 1988, the tank received radioactive liquid waste (including wash water from the ARA-I hot cells) methanol, acetone, chlorinated paraffin, and mixed acids from materials testing and research and metal-etching processes. Periodically, the contents of the tank were emptied into a tank truck and transported to the Idaho Nuclear Technology and Engineering Center (INTEC) (known as the Idaho Chemical Processing Plant at that time) for disposal. The ARA-I facility was formally shut down in 1988, and the tank was partially excavated. All lines into and out of the tank were cut and capped, and the contents were agitated and pumped out, leaving a small amount of residual liquid and sludge in the tank. Soil from the excavation was replaced over the tank. The selected remedy for the ARA-16 site is removal of the ARA-16 Radionuclide Tank and piping, vault and associated gravel.

The ARA-16 tank contains a mixture of sludge and liquid waste (Coveleskie 1999). The waste contains high concentrations of radionuclides, toxic metals, and organics, including PCBs. Based on sampling results and process knowledge, the waste is considered low-level radioactive mixed waste and RCRA-listed waste. The associated RCRA waste codes are F001 because of concentrations of trichloroethylene, methylene chloride, and 1,1,1-trichloroethane, and F005 because of concentrations of

toluene. In addition, the waste is classified as RCRA characteristic waste for trichloroethylene. Aroclor-1260 was detected at 98 parts per million (ppm) in the sludge; hence, the waste is also regulated under the Toxic Substances Control Act (TSCA).

The waste sludge and liquid will be removed from the tank, placed in approved containers, and transported to an approved storage or treatment facility per Waste Generator Services (WGS).

Excavation and removal of the structural components of the tank system will require use of conventional excavation equipment such as backhoes and front-end loaders as well as hand digging. During excavation, real-time gamma surveys will be used to delineate the extent of contamination and allow segregation of contaminated soil from uncontaminated soil. The contaminated soil will be disposed of at an approved facility. Uncontaminated soil will be returned to the excavation site.

Following removal of the ARA-16 tank system, the excavated site will be backfilled with uncontaminated soil, compacted, and vegetated in accordance with INEEL guidelines (DOE-ID 1989).

1.4 Additional Activities

Other work activities that may be performed prior to or during the performance of WAG 5-12 RD/RA projects include the following as applicable:

- Prepare and obtain approval of National Environmental Policy Act (NEPA) documentation
- Prepare and establish the hazard categorization determination
- Perform a Davis-Bacon determination
- Prepare and complete characterization sampling and analysis plan (SAP)
- Prepare and complete engineering and remediation packages
- Prepare and initiate Integrated Safety Management System work controls, integrated planning sheets, job safety analyses, radiological work permits, safe work permits, and other permits
- Prepare waste documentation
- Prepare and obtain approval for the Storm Water Prevention Plan, as necessary
- Prepare industrial hygiene (IH) exposure assessment (EA)
- Perform site-specific crew training
- Mobilize equipment to the project site
- Arrange for temporary power and telephone (as necessary)
- Ensure work site isolation and barriers

- Perform equipment and personnel decontamination
- Perform job-site clean up.
- Perform site sampling including, but not limited to, collecting soil, vegetation, animal, liquid, or other samples at the ARA/PBF WAG 5 locations
- Utilize equipment such as remote cameras, robotics, or other equipment to gather information while reducing personnel risks.

Note: *Sequence of events may vary depending on resource availability and field conditions.*

2. KEY SITE PERSONNEL RESPONSIBILITIES

The organizational structure for this project reflects the resources and expertise required to perform the work, while minimizing risks to worker health and safety, the environment, and the general public. The names of the individuals in key roles at the site, and lines of responsibility and communication, are shown on the organizational chart for each project, as described in the applicable appendix. The following sections outline the responsibilities of key site personnel.

2.1 Environmental Restoration Director

The ER director has ultimate responsibility for the technical quality of all projects, maintaining a safe environment, and the safety and health of all personnel during field activities performed by or for the ER program. The ER director provides technical coordination and interfaces with the DOE-ID Environmental Support Office. The ER director ensures that:

- Project/program activities are conducted according to all applicable federal, state, local, and company requirements and agreements
- Program budgets and schedules are approved and monitored to be within budgetary guidelines
- Personnel, equipment, subcontractors, and services are available
- All applicable project documentation that is submitted for review by the ER Independent Review Committee complies with Management Control Procedure (MCP)-3562, "Hazard Identification, Analysis and Control of Operational Activities," or Standard (STD)-101, "Integrated Work Control Process" (INEEL 1999a), before work can begin.

Direction is provided for the development of tasks, evaluation of findings, development of conclusions and recommendations, and production of reports.

2.2 CFA and PBF Site Area Directors

The CFA and PBF site area directors have the authority and responsibility to ensure proper ownership of all activity within their respective sites for all work processes and work packages including, but not limited to, the following:

- Establishing and executing monthly, weekly, and daily operating plans
- Executing the site environmental, safety, and health/quality assurance (ES&H/QA) program
- Executing the Integrated Safety Management System for their respective site
- Executing the Enhanced Work Planning for their respective site
- Executing the Voluntary Protection Program in the area
- Ensuring all environmental compliance within the area

- Executing that portion of the voluntary compliance order that pertains to the area
- Correcting the root cause functions of the accident investigation in the area
- Correcting the root cause functions of the voluntary compliance order for the area.

2.3 CFA and PBF Facility Managers

The facility manager is responsible for maintaining his/her assigned facility and must be cognizant of work being conducted in the facility. The facility manager is responsible for the safety of personnel and the safe completion of all project activities conducted within his/her area in accordance with the site area director concept. The PBF and ARA responsibilities for OU 5-12 are identified in the *Interface Agreement Between the Environmental Restoration Program, Waste Area Group 5 and D&D&D, and the Power Burst Facility* (INEEL 1999b) and the *Interface Agreement Between the Environmental Restoration Program, Waste Area Groups 4, 5, 10 and D&D&D, and the Central Facilities Area* (INEEL 1999c), respectively. The facility manager will be kept informed of all activities performed in the area. The facility manager and the FTL will agree on a schedule for reporting work progress and plans for work. The facility manager may serve as advisor to task-site personnel with regard to site operations.

2.4 Project Manager

The WAG 5 project manager (PM) will ensure that all activities conducted during the project comply with INEEL MCPs and program requirements directives (PRDs); all applicable OSHA, EPA, DOE, U.S. Department of Transportation, and State of Idaho requirements; and that tasks comply with the *Implementing Project Management Plan for the Idaho National Engineering and Environmental Laboratory Remediation Program* (INEEL 1998a), the Quality Assurance Project Plan (QAPjP) (DOE-ID 1997b), this HASP, and the FSP. The PM coordinates all document preparation, field, laboratory, and modeling activities. The PM is responsible for the overall scope, schedule, and budget of the project.

The PM will implement the project requirements and ensure work is performed as planned for the project. The PM is responsible for: (a) developing resource-loaded, time-phased control account plans based on the project technical requirements, budgets, and schedules, and (b) assigning project tasks. Other functions and responsibilities of the PM include the following:

- Ensuring the technical review and acceptance of all project documentation
- Developing the documentation required to support the project
- Developing site-specific plans required by the ER program such as work plans, environmental, safety, and health (ES&H) plans, and SAPs
- Ensuring that project activities and deliverables meet schedule and scope requirements as described in the *Federal Facility Agreement and Consent Order* (FFA/CO), Attachment A, "Action Plan for Implementation of the Federal Facility Agreement and Consent Order," (DOE-ID 1991) and applicable guidance
- Identifying the requirements and scheduling, and supporting the CERCLA and NEPA public review and comment process

- Ensuring compliance with Conduct of Operations and that the hazards checklist and job-safety analysis is completed as required by MCP-3562, "Hazard Identification, Analysis and Control of Operational Activities" (INEEL 1999a)

- Identifying the subproject technology needs

- Coordinating and interfacing with the units within the program support organization on issues relating to quality assurance, ES&H, and NEPA support for the project

- Coordinating the site-specific data collection, review for technical adequacy, and data input to an approved database such as the Environmental Restoration Information System

- Coordinating and interfacing with subcontractors to ensure milestones are met, adequate management support is in place, technical scope is planned and executed appropriately, and project costs are kept within budget

- Ensuring compliance with Conduct of Maintenance and Standard 101 for developing work controls, as applicable.

2.5 ER S&H/QA Manager

The ER Safety and Health/Quality Assurance (S&H/QA) manager or designee is responsible for managing S&H/QA resources to ensure that S&H/QA programs, policies, standards, procedures, and mandatory requirements are planned, scheduled, implemented, and executed in the daily operations for the ER program at the INEEL. The manager directs the S&H/QA compliance accomplishment of all activities by providing technical and administrative direction to subordinate staff and through coordination with related functional entities. The ER S&H/QA manager reports directly to the ER director. Under the direction of the ER director, the ER S&H/QA manager represents the ER directorate in all S&H/QA matters.

The ER S&H/QA manager is responsible for the management of the following technical disciplines and implementation of the programs related to the following disciplines:

- Radiological controls (RadCon) personnel

- Industrial safety personnel

- Fire protection personnel

- Quality assurance personnel

- Industrial hygiene (IH) personnel (matrixed)

- Emergency preparedness personnel (matrixed).

2.6 CFA and PBF ES&H/QA Managers

The PBF and CFA ES&H/QA managers or designees are responsible for ensuring that ES&H oversight is provided for all ER programs and projects. These positions report to and are accountable to the respective site area directors. The ES&H/QA manager performs line management review, inspections, and oversight in compliance with PRD-25, "Activity Level Hazard Identification, Analysis, and Control," (INEEL 1999d) and MCP-3562, "Hazard Identification, Analysis and Control of Operational Activities" (INEEL 1999a). Project or program management will bring all ES&H/QA concerns, questions, comments, and disputes that cannot be resolved by the HSO or one of the assigned ES&H professionals to the ER ES&H/QA manager or to the respective site ES&H/QA manager.

2.7 Project Engineer

The Project Engineer is responsible for field implementation of the project. This responsibility involves ensuring that all field tasks receive appropriate health and safety review before commencement, and that the necessary equipment and facilities are made available to implement the provisions of this plan. The Construction Manager may delegate any or all of the above responsibilities and reports to the ER project manager. Responsibilities include the following:

- Ensuring that all project tasks receive appropriate health and safety review, compliant with MCP-3562, "Hazard Identification, Analysis and Control of Operational Activities," (INEEL 1999a) or STD-101, "Integrated Work Control Process" (INEEL 1999a) before commencing work
- Confirming that the necessary equipment and facilities are made available to implement the provisions of this plan
- Reporting the project status to the PM.

2.8 Construction Coordinator

The Construction Coordinator (CC) represents project management at the construction site. The CC works with the FTL to manage field operations and execute the work plan, enforce site control, and document task-site activities. In addition, the CC may conduct the daily plan-of-the-day briefings at the start of the shift. All health and safety issues at the task site must be brought to the CC's attention.

If the CC leaves the project site, an alternate individual will be appointed to act as the CC. A person acting as CC on the project site must meet all CC training requirements outlined in Section 4 of the project HASP. The identity of the acting CC will be conveyed to task-site personnel, recorded in the daily force reports, and communicated to the facility representative (when appropriate).

If the nature of the fieldwork requires involvement of field team staffing by equipment operators, laborers, or other crafts, a representative from the organization supplying these additional resources interfaces with the CC to provide work supervision. This person may be designated the job-site supervisor.

2.9 Job-Site Supervisor

The Job Site Supervisor (JSS) serves as the representative for the Facilities, Utilities, and Maintenance (FUM) Department Site Services Branch at the task site. The JSS is the supervisor of crafts and other FUM personnel assigned to work at the task site. The JSS is the interface between FUM and ER, and works closely with the FTL at the task site to ensure that the objectives of the project are accomplished in a safe and efficient manner. The JSS and FTL work as a team to accomplish daily operations at the task site, identify and obtain additional resources needed at the task site, and interact with the HSO, IH, safety professional, radiological engineer, and/or radiological control technician (RCT) on matters regarding health and safety. The JSS, like the FTL, must be informed about any health and safety issues that arise at the task site and may stop work at the task site if an unsafe condition exists. The primary responsibilities of the JSS include the following:

- Managing field operations and executing the work plan
- Enforcing site control and documenting work site activities
- Identifying and obtaining additional resources (as needed) at the site
- Interacting with the IH and safety engineer.

2.10 Subcontractor Job-Site Supervisor

A subcontractor JSS serves as the subcontractor safety representative at the task site. The subcontractor JSS may also serve as the subcontractor PM. The subcontractor JSS is the subcontractor field supervisor for subcontractor personnel assigned to work at the task site. The subcontractor JSS and FTL work as a team to accomplish daily operations at the task site, identify and obtain additional resources needed at the task site, and interact with the HSO, IH, safety professional, radiological engineer, and/or RCT on matters regarding health and safety. The subcontractor JSS, like the FTL, must be informed about any health and safety issues that arise at the task site and may stop work at the task site if an unsafe condition exists. The subcontractor JSS will provide information to the FTL regarding the nature of their work for input at the daily prejob briefing.

2.11 Field Team Leader

The Field Team Leader (FTL) has ultimate responsibility for the safe and successful completion of assigned project tasks. The FTL ensures that a prejob briefing occurs before the project begins as per MCP-3003, "Performing Pre-Job Briefings and Post-Job Reviews" (INEEL 1999e). A postjob briefing will be performed as necessary. All prejob and postjob briefings must be properly documented. The FTL manages field operations and executes the work plan, enforces site control and documents site activities, and conducts and documents the daily, less formal, prejob safety briefings at the start of the shift. All health and safety issues must be brought to the attention of the FTL.

If the FTL leaves the task site, an alternate individual will be appointed to act as the FTL. A person acting as FTL on the task site must meet all the FTL training requirements as outlined in Section 4 of the project HASP. The identity of the acting FTL will be conveyed to task-site personnel, recorded in the daily force report, and communicated to the WAG 5 PM, and CFA and/or PBF director, or designee, when appropriate.

If the nature of the fieldwork requires involvement or field team staffing by equipment operators, laborers, or other crafts, a representative from the organization supplying these additional resources will interface with the CC to provide work supervision. This person may be designated the JSS. Additionally, the FTL will serve as the primary interface with subcontractor personnel at the site. The FTL will complete the Job Requirements Checklist (JRC) as per MCP-2798, "Maintenance Work Control" (INEEL 1998b).

The FTL will be responsible for ensuring compliance with waste management requirements and will coordinate such activities with the environmental compliance coordinator and/or designee.

2.12 Sampling Team

The sampling team will perform the onsite task necessary to collect the samples. The sampling team will consist of a minimum of two members, and the buddy system will be implemented. The IH and RadCon personnel will support the sampling team, as necessary, when inside the contamination area. The sampling team will be led by a sampling FTL who may also serve as the field geologist.

2.13 Task Site Personnel

All task-site personnel, including BBWI and subcontractor personnel, will understand and comply with the requirements of the project HASP. The FTL or JSS will brief task-site personnel at the start of each shift. During the prejob briefing all daily tasks, associated hazards, engineering and administrative controls, required personal protective equipment (PPE), work control documents, and emergency conditions and actions will be discussed.

- Input from the project HSO, IH, and RadCon personnel to clarify task health and safety requirements will be provided
- All personnel are encouraged to ask questions regarding site tasks and provide suggestions on ways to perform required tasks in a more safe and effective manner based on the lessons learned from previous days' activities
- Once at the task site, personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL, JSS, or HSO for corrective action
- If it is perceived that an unsafe condition poses an imminent danger, task-site personnel are authorized to stop work immediately, then notify the CC, FTL, JSS, or HSO of the unsafe condition.

2.14 Nonworkers

All personnel who may be on the project task site, but are not part of the field team, are considered nonworkers for the purposes of this project (e.g., surveyor, equipment operator, or other crafts personnel not assigned to the project).

- A person will be considered "on-Site" when they are present in or beyond the designated support zone

- Nonworkers will be deemed occasional site workers per 29 CFR 1910.120/1926.65 and must meet minimum training requirements for such workers as described in the OSHA standard and any additional site-specific training, as identified in Section 4 of the project HASP

- If the nature of a nonworker's tasks requires entry into the work control zone, then they must meet all the same training requirements as the workers

- A site representative must accompany all nonworkers until they have completed their 24-hour supervised field experience.

2.15 Visitors

All visitors with official business at the project task site, including INEEL personnel, representatives of DOE, and/or state or federal regulatory agencies, may not proceed beyond the support zone without receiving project-specific HASP training. They must also sign the HASP training acknowledgement form, receive a safety briefing, wear the appropriate PPE, and provide proof of meeting all training requirements as specified in Section 4 of the project HASP.

Visitors will be escorted by a fully-trained, task-site representative (such as the CC, FTL, JSS, or HSO, or a designated alternate) at all times while on the task site.

A casual visitor to the task site is a person who does not have a specific task to perform or other official business to conduct at the task site. Casual visitors are not permitted on the project task site.

2.16 ER Environmental Compliance Coordinator

The assigned ER environmental compliance coordinator oversees, monitors, and advises the PM and CC or FTL performing task-site activities on environmental issues and concerns by ensuring compliance with DOE orders, EPA regulations, and other regulations concerning the effects of task-site activities on the environment. The environmental affairs coordinator provides support surveillance services for hazardous waste storage and transport, and surface water/storm water runoff control. The environmental compliance coordinator will assist the CC or FTL in completing the JRC.

2.17 Health and Safety Officer

The HSO is the person assigned to the site who serves as the primary contact for health and safety issues. The HSO advises the CC and FTL on all aspects of health and safety and is authorized to stop work at the site if any operation threatens worker or public health and/or safety. The HSO may be assigned other responsibilities, as stated in other sections of this HASP, as long as they do not interfere with the primary responsibilities. The HSO is authorized to verify compliance to the HASP, conduct inspections, require and monitor corrective actions, monitor decontamination procedures, and require corrections, as appropriate. The HSO is supported by ES&H/QA professionals at the site (safety engineer, IH, RCT, radiological engineer [RE], environmental coordinator, and facility representative, as necessary).

Personnel assigned as the HSO, or alternate HSO, must be qualified (per the OSHA definition) to recognize and evaluate hazards and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO may also be the IH, safety engineer (SE), or in some cases the FTL

or CC (depending on the hazards, complexity, and size of the activity involved, and required concurrence from the ER ES&H/QA manager) at the site, other site responsibilities of the HSO must not conflict (philosophically or in terms of significant added volume of work) with the role of the HSO at the site.

If it is necessary for the HSO to leave the site, an alternate individual will be appointed by the HSO to fulfill this role, the identity of the acting HSO will be recorded in the FTL logbook, and site personnel will be notified.

2.18 Industrial Hygienist

The assigned IH is the primary source for information regarding nonradiological hazardous and toxic agents at the site. The IH assesses the potential for worker exposures to hazardous agents according to the *Safety and Health Manual*, MCPs, and accepted industry IH practices and protocol. By participating in site characterization, the IH assesses and recommends appropriate hazard controls for the protection of site personnel, operates and maintains airborne sampling and monitoring equipment, reviews for effectiveness, and recommends and assesses the use of PPE required in this HASP (recommending changes as appropriate).

Note: *The IH will review all copies of Form-340.02, "Employee Job Function Evaluations," to validate management's completion of the form. After validation, the form is sent to the OMP for the scheduling of a medical evaluation, as needed.*

Following an evacuation, the IH in conjunction with other recovery team members will assist the CC in determining whether conditions exist for safe site reentry as described in Section 11. Personnel showing health effects (signs and symptoms) resulting from possible exposure to hazardous agents will be referred to an Occupational Medical Program (OMP) physician by the IH, their supervisor, or the HSO. The IH may have other duties at the site, as specified in other sections of this HASP or in PRDs and/or MCPs. During emergencies involving hazardous materials, airborne sampling and monitoring results will be coordinated with members of the Emergency Response Organization (ERO).

2.19 Safety Professional

The assigned safety professional reviews work packages, observes site activity, assesses compliance with the *Safety and Health Manual*, approves safe work permits, advises the FTL, HSO, and CC on required safety equipment, answers questions on safety issues and concerns, and recommends solutions to safety issues and concerns that arise at the site. The safety professional may have other duties at the site as specified in other sections of this HASP or in PRDs and/or MCPs.

2.20 Fire Protection Engineer

The assigned fire protection engineer reviews the work packages, conducts preoperational and operational fire hazard assessments, and is responsible for providing technical guidance to site personnel regarding all fire protection issues. Additionally, the assigned project fire protection engineer will provide fire extinguisher training to all project team personnel as part of the site-specific training.

2.21 Radiological Control Technician

The assigned RCT is the primary source for information and guidance on radiological hazards. The RCT will be present at the task site during any work operations when a radiological hazard to personnel

may exist or is anticipated. The RCT will assist the CC or FTL in completing the JRC. Responsibilities of the RCT include radiological surveying of the task site, equipment, and samples; providing guidance for radioactive decontamination of equipment and personnel; and accompanying the affected personnel to the nearest INEEL medical facility for evaluation if significant radiological contamination occurs. The RCT must notify the FTL and HSO of any radiological occurrence that must be reported as directed by the *Radiation Protection Manual* (INEEL Manual #15B).

2.22 Radiological Engineer

The RE is the primary source for information and guidance relative to the evaluation and control of radioactive hazards at the site. The RE will provide engineering design criteria and review of containment structures and makes recommendations to minimize health and safety risks to site personnel. Responsibilities of the RE include: (1) performing radiation exposure estimates and as low as reasonably achievable (ALARA) evaluations, (2) identifying the type(s) of radiological monitoring equipment necessary for the work, (3) advising the CC and RCT of changes in monitoring or PPE, and (4) advising personnel on site evacuation and reentry. The RE may also have other duties to perform as specified in other sections of this HASP or in the *Radiation Protection Manual*.

2.23 Quality Engineer

The quality engineer provides guidance on task-site quality issues, when requested. The quality engineer observes task-site activities and verifies that task-site operations comply with quality requirements pertaining to these activities. The quality engineer identifies activities that do not comply or have the potential for not complying with quality requirements and suggests corrective actions.

2.24 Sample Management Office

The INEEL Sample Management Office (SMO) is responsible for obtaining necessary laboratory services. The SMO ensures that data generated from samples collected and analyzed meet the needs of the project by validating all analytical laboratory data to resident protocol and that data are reported to the project personnel in a timely fashion as required by the FFA/CO.

The assigned SMO representative will interface with the PM and/or designee during the preparation of the SAP database as required by MCP-227, "Sampling and Analysis Process for Environmental Management Funded Activities." This individual also provides guidance on the appropriate number of field quality control samples required by the QAPjP (DOE-ID 1997c), provides guidance on the appropriate bottle size and preservation for sample collection, and ensures the sample identification numbers used by the project are unique from all others ever assigned by the Integrated Environmental Data Management System. The preparation of the plan database, along with completion of the SMO services request form (INEEL Form 435.26), initiates the sample and sample waste tracking activities performed by the SMO.

The SMO contracted laboratory will have the overall responsibility for laboratory technical quality, laboratory cost control, laboratory personnel management, and adherence to agreed-upon laboratory schedules. Responsibilities of the laboratory personnel include preparing analytical reports, ensuring chain-of-custody information is complete, and ensuring all quality assurance/quality control procedures are implemented in accordance with SMO-generated task order statements of work and master task agreements.

3. RECORDKEEPING REQUIREMENTS

3.1 Industrial Hygiene and Radiological Monitoring Records

The IH will record airborne monitoring and/or sampling data (both area and personal) on the Hazards Assessment and Sampling System. All monitoring and sampling equipment will be maintained and calibrated per INEEL procedures and the manufacturer's specifications. Industrial hygiene airborne monitoring and sampling data are treated as limited access information and maintained by the IH per INEEL *Safety and Health Manual* procedures. Any airborne monitoring or sampling done by non-IH/safety personnel will be documented in a project-controlled logbook to be reviewed by the IH.

The RCT maintains a logbook of all radiological monitoring, daily site operational activities, and instrument calibrations. Radiological monitoring records are maintained according to the INEEL *Radiation Protection Manual* procedures.

Task site personnel, or their representatives, have a right to both IH and RCT monitoring and sampling (both area and personal) data.

3.2 FTL Logbook and Site Attendance Logbook

The FTL will keep a record of daily site events in the FTL logbook and will maintain accurate records of all personnel (workers and nonworkers) who are onsite each day in a site attendance logbook. Logbooks must be obtained from Administrative Record and Document Control (ARDC). Completed logbooks are submitted to ARDC along with other documents at the project's completion.

3.3 Administrative Record and Document Management

The ARDC shall organize and maintain data and reports generated by ER program field activities. The ARDC maintains a supply of all controlled documents and provides a documented system for the control and release of controlled documents, reports, and records. Copies of the management plans for the ER program, this HASP, the *Quality Program Plan for the Environmental Restoration Program,* PLN-125, the QAPjP, and other documents pertaining to this work are maintained in the project file by the ARDC. All project records and logbooks, except IH and RCT records, must be forwarded to ARDC within 30 days after completion of field activities.

4. PERSONNEL TRAINING

All site personnel will receive training as specified in OSHA 29 CFR 1910.120/1926.65 and the INEEL *Safety and Health Manual*s. Radiation workers will be trained according to the INEEL *Radiation Protection Manual,* MCP-126, "Training." Table 4-1 summarizes training requirements for site personnel. Specific training requirements for each worker may vary depending on the hazards associated with their individual job assignment and required access into radiologically controlled areas.

4.1 General Training

Proof that all required training courses have been completed (including applicable refresher training) must be maintained on the site at all times. Examples of acceptable written training documents include: "40 Hour OSHA HAZWOPER Card," "Respirator Authorization Card," "DOE Certificate of Core Radiological Training II Card," "Medic/First Aid Training Card," and/or a copy of an individual's or department's TRAIN System printout demonstrating completion of training. A copy of the certificate, issued by the institution where the training was received, is also acceptable proof of training. The DOE radiological worker training must be documented on an official authorized card (blue DOE seal in upper left corner) and have the designated INEEL site-specific training stamped or written on the card.

4.2 Site-Specific Project Training

Before beginning work at the site, site-specific training will be conducted by the FTL, CC, or HSO. This training will consist of a complete review of this HASP and attachments, applicable job safety analysis, safe work permits, and other applicable work control documents with time for discussion and questions. At the time of this training, personnel training records will be checked and verified to be current and complete for all required training shown in Table 4-1. Upon completing site-specific training, personnel will sign Form 361.25, "Group Read and Sign Training Form," indicating that they have received this training, understand the tasks and associated hazards that will be conducted, and agree to follow all HASP and other safety requirements.

The HSO, FTL, or CC will monitor each newly 40-hour-trained worker's performance to meet the three days of supervised field experience in accordance with 29 CFR 1910.120 (e)/29 CFR 1926.65 (e). The supervised field experience verification form (Form # 361.47) will be completed. This will satisfy the HAZWOPER initial 24-hour supervised field experience. For 24-hour trained HAZWOPER workers, the same procedure will be followed except the supervised field experience will only last one day.

The training records will be forwarded to the Environmental Operations training coordinator (MS 3902) for retention in the employee training records (TRAIN).

4.3 Daily Plan of the Day Briefing and Lessons Learned

The FTL, CC, HSO, RCT, and JSS, as applicable, will conduct a daily plan-of-the-day safety briefing of the task(s) to be performed that day. During this briefing, tasks are to be outlined, hazards identified, hazard controls and work zones established, PPE requirements discussed, and employees' questions answered. At the completion of this briefing, work control documents will be read and signed, such as safe work permits and radiological work permits. Particular emphasis will be placed on lessons learned from the previous day's activities and how tasks can be completed in the safest, most efficient manner. All personnel will be asked to contribute ideas to enhance worker safety and mitigate potential exposures at the site.

Table 4-1. Required training for site personnel.

Training	FTL, CC, or HSO (Required)	Field Team (Required)	Nonworkers [a] (Required)	Visitors [b] (Required)
Site-specific training[c]	X	X	X	X
Decontamination (HASP Section 10)[d]	X	X	X	X
Hazard communication[d]	X	X	X	X
Fire extinguisher training	X			
Site control and warning devices[d]	X	X	X	X
HASP Emergency Response plan (Section 11)[d]	X	X	X	X
40-hour HAZWOPER[e]	X	X		X[g]
24-hour HAZWOPER occasional worker[f]			X	X[g]
8-hour HAZWOPER site supervisor	X			
Hearing conservation	X[g]	X[g]	X[g]	X[g]
DOE Radiological Worker II/Radiological Worker I	X	X	X[g]	
CPR and Medic First Aid[h]	X			
Respirator qualification and fit test	X[i]	X[i]		
Facility site-specific training	X	X	X	X
HAZMAT employee general awareness training[j]	X	X	X	

a. Nonworkers (occasional site workers) who must enter the exclusion zone (EZ) are required to have the training necessary to perform their assigned tasks within the EZ. This may include the same training as the FTL (depending on the task location).

b. Visitors are required to meet the nonworker training requirements, at a minimum, if they enter the EZ.

c. Training will be documented using HASP acknowledgement forms (site-specific training and 24-hr supervised experience).

d. Will be included in site-specific training.

e. Includes 40 hours of classroom instruction and 24 hours of supervised field experience.[a]

f. Includes 24 hours of classroom instruction and 8 hours of supervised field experience.[a]

g. As required based on project duties and site zone access requirements.

h. Two Medic First/CPR qualified individuals must be present during site activities.

i. If entering areas requiring respirator use.

j. If identified as "HAZMAT" employee (i.e., anyone who directly affects hazardous material transportation safety by handling, packaging, labeling, loading, unloading, moving, driving [per 49 CFR 171.8]).

5. OCCUPATIONAL MEDICAL SURVEILLANCE PROGRAM

The INEEL site personnel will participate in the INEEL OMP, as required by DOE Order 5480.8a and OSHA 29 CFR 1910.120/1926.65. Medical surveillance examinations will be provided before assignment, annually, and after termination of hazardous waste site duties or employment. This includes personnel who are or may be exposed to hazardous substances at or above the OSHA-permissible exposure limit or published exposure limits, without regard to respirator use, for 30 or more days per year. Personnel who wear a respirator in performance of their job, or who are required to take respirator training to perform their duties under this plan, must participate in the medical evaluation program for respirator use at least annually as required by 29 CFR 1910.134 (1910.139 when final rule becomes effective). This HASP, task hazard analysis, required PPE, confined space entry, and other exposure-related information must be provided to an OMP physician for each employee participating in OU 5-10 RD/RA project site activities. Exposure monitoring results and hazard information furnished to the OMP physician must be supplemented or updated annually as long as the employee is required to maintain a hazardous waste/hazardous material employee medical clearance.

Note: *Project management will ensure that an Employee Job Function Evaluation is validated by the project IH and then submitted to the OMP for review before any employee can begin work on the project.*

The OMP physician will evaluate the physical ability of an employee to perform the work assigned, as identified in the site HASP or other job-related documentation. A documented medical clearance (physician's written opinion) will be provided to the employee and line management stating whether the employee has any detected medical condition that would place him/her at increased risk of material impairment of his/her health from work in hazardous waste operations, emergency response, respirator use, and confined space entry (as applicable). The physician may impose restrictions on the employee by limiting the amount and/or type of work performed. The OMP responsibilities, with regard to personnel assigned to hazardous waste site activities, include, but are not limited to the following:

- Providing current comprehensive medical examinations (as determined by the examining physician) at an INEEL medical facility for full-time personnel
- Obtaining records/reports from employee's private physicians, as required by the OMP director
- Performing a medical evaluation on return-to-work cases following an absence in excess of 1 work week (40 consecutive work hours) resulting from illness or injury
- Conducting a medical evaluation in the event that management questions the ability of an employee to work or if an employee questions his/her own ability to work.

Note: *Employees will not be permitted to work on the project until the OMP has sent a medical clearance to management or the IH has validated that no substance-specific medical evaluation is necessary.*

The attending physical exam findings, blood chemistry and urinalysis results, preexisting medical conditions, nature of work to be performed, actual and potential hazards and exposures, and other factors deemed appropriate by the physician for determining the following for each employee:

- Ability to perform relevant occupational tasks

- Ability to use respiratory protection
- Ability to work in other PPE and heat/cold stress environments
- Requirement for entry into substance-specific medical surveillance programs.

If the OMP lacks sufficient information to complete a medical evaluation before respirator training, the employee's supervisor will be notified. The employee will not be permitted to fit test until the needed information is provided and any additional examination or testing is completed.

5.1 Subcontractor Workers

Subcontractor site personnel will participate in a subcontractor medical surveillance program that satisfies the requirements of OSHA 29 CFR 1910.120/1926.65. This program must make available medical examinations before assignment, annually, and after termination of hazardous waste duties. The physician's written opinion will serve as documentation that subcontractor personnel are fit for duty.

Medical data from the subcontractor employee's private physician, collected pursuant to hazardous material worker qualification, will be made available to the INEEL OMP physicians upon request. Also, subcontractor employee's past radiation exposure histories must be submitted to INEEL radiation dosimetry and records section, in accordance with the *INEEL Radiation Protection Manual,* MCP-188, "Issuance of Thermolumincescent Dosimeters and Obtaining Employees Dose History," and MCP-2381, "Employees Exposure Questionnaire," of the *Radiation Protection Manual.*

5.2 Injuries on the Site

It is BBWI's policy that an OMP physician examine all injured personnel if an employee is injured on the job, if an employee is experiencing signs and symptoms consistent with exposure to a hazardous material, or if there is reason to believe that an employee has been exposed to toxic substances, or physical or radiological agents in excess of allowable limits.

Note: *Subcontractor employees will be taken to the closest INEEL medical facility to have an injury stabilized before transport to the subcontractor's treating physician or medical facility.*

In the event of a known or suspected injury or illness due to exposure to a hazardous substance, or physical or radiological agent, the employee(s) will be transported to the nearest INEEL medical facility for evaluation and treatment, as necessary. The FTL or CC is responsible for obtaining as much of the following information as is available to accompany the individual to the medical facility:

- Name, job title, work (site) location, and supervisor's name and phone number
- Substances, physical or radiological agents (known or suspected); material safety data sheet, if available
- Date of employee's first (known) exposure to the substance, physical or radiological agent
- Locations, dates, and results of any airborne exposure monitoring and/or sampling
- PPE in use during this work (for example, type of respirator and cartridge used)

- Number of days per month PPE has been in use
- Anticipated future exposure to the substance, physical or radiological agent.

Further medical evaluation will be determined by the treating/examining physician according to the signs and symptoms observed, hazard involved, exposure level, and specific medical surveillance requirements established by the OMP director in compliance with 29 CFR 1910.120/1926.65.

As soon as possible after an injured employee has been transported to the INEEL medical facility, the CC or designee will make notifications as indicated in Section 11 of this HASP.

The RadCon personnel will evaluate all actual and/or suspected abnormal radiological exposures in excess of allowable limits and will establish the followup actions. For internal uptakes (as calculated committed effective dose equivalent values), INEEL engineering design file (EDF)- INEL003, "Established Levels of Radionuclide Intake for Consideration of Medical Intervention," will be used as the basis for this evaluation and follow-up actions. An OMP physician will examine all wounds to determine the nature and extent of the injury. The physician and Radiological Control will determine if the wound can be bandaged adequately for entry into a radiological contamination area in accordance with Article 542 of the *INEEL Radiological Protection Manual*.

5.3 Substance-Specific Medical Surveillance

An IH assessment will be performed to determine if any of the contaminants of concern require additional substance-specific regulatory medical surveillance. This assessment will be performed and documented in accordance with MCP-2748, "Medical Surveillance."

6. ACCIDENT PREVENTION PROGRAM

The OU 5-12 RD/RA activities present numerous potential chemical, radiological, and physical hazards to personnel conducting the required tasks. It is critical that all personnel understand and follow the site-specific requirements of this HASP. Engineering controls, hazard isolation, specialized work practices, and the use of PPE will all be implemented to eliminate or mitigate all potential hazards and exposures. However, every person on the site must play their role in the identification and control of hazards.

6.1 Voluntary Protection Program

The INEEL's safety process embraces the Voluntary Protection Program (VPP) criteria, principles, and concepts. All levels of management are responsible for implementing safety policies and programs and for maintaining a safe and healthful work environment. Project personnel and subcontractors are expected to take a proactive role in preventing accidents, ensuring safe working conditions for themselves and fellow personnel, and complying with all work control documents and approved procedures.

The VPP is a process that promotes and encourages continuous safety improvement, but is not a requirement of any regulatory agency. BBWI and subcontractors participate in VPP voluntarily for the safety of their employees. The VPP incorporates five key elements:

1. Management Commitment to safety and health is demonstrated through their visibility in the workplace and providing the necessary resources.

2. Employee Involvement means that employees have an active and meaningful role in contributing to the structure and operation of the safety and health program. This involvement results in ownership of the safety and health program by all employees.

3. Work Site Analysis includes analysis of new facilities and processes, comprehensive safety and health surveys, routine self-assessments, a reliable system for employees to report hazards, and an accident/incident investigation system and trend analysis.

4. Hazard Prevention and Control means that written safety rules and safe work practices must be in place to eliminate and/or control hazards.

5. Safety and Health Training is provided to all employees to ensure that they know what their responsibilities are and what is necessary to protect them from safety and health hazards.

6.2 General Safe-Work Practices

The following procedures are mandatory for all BBWI and subcontractor personnel working on the site. All site visitors entering the site area (support zone [SZ] and beyond) must follow these procedures. Failure to follow these practices may result in permanent removal from the site and other disciplinary actions. The CC and HSO are responsible for ensuring these hazard control practices are followed at the site:

- Limit access to authorized BBWI, subcontractor, and visitor personnel only.

- All personnel have the authority to initiate **STOP WORK** actions. INEEL *Safety and Health Manual,* MCP-553, "Stop Work/Shut Down Action," will be used.

- Absolutely no eating, drinking, chewing gum or tobacco, smoking, applying cosmetics, or any other practice that increases the probability of hand-to-mouth transfer and ingestion of materials except in designated zone(s).

- Be aware of and comply with all safety signs, color codes, and barriers. Adhere to INEEL *Safety and Health Manual 14A,* MCP-2714, "Safety Signs, Color Codes, and Barriers."

- Be alert for dangerous situations, strong or irritating odors, airborne dusts or vapors, and broken containers. Report all potentially dangerous situations to the CC or HSO.

- Avoid direct contact with potentially contaminated substances. Do not walk through spills or other areas of contamination. Avoid kneeling, leaning, or sitting on equipment or ground that may be contaminated.

- Be familiar with the physical characteristics of the site, including, but not limited to:

  - Wind direction
  - Accessibility of fellow personnel, equipment, and vehicles
  - Communications at the site and with other nearby facilities
  - Areas of known or suspected contamination
  - Major roads and means of access to and from the site
  - Nearest water sources and fire fighting equipment
  - Warning devices and alarms
  - Capabilities and location of nearest emergency assistance.

- Report all broken skin or open wounds to the HSO or CC. An INEEL physician will determine if the wound presents a significant risk of internal chemical or radiological exposure. The OMP physician will consider how the wound can be bandaged and will recommend PPE to be worn by the injured employee. Personnel with unprotected wounds will not be permitted to enter chemical or radiologically contaminated areas, nor will they handle contaminated or potentially contaminated materials at the site without having been examined by an OMP physician.

- Prevent releases of hazardous materials. If a spill occurs, try to isolate the source (if possible and if this does not create a greater exposure potential), then report it to the CC or HSO. Appropriate spill response kits, or other containment and absorbent materials, will be maintained at the site.

- Avoid unnecessary and excessive movement during decontamination.

- Electrical equipment, wiring, cables, switches, and current overload protection will meet applicable regulations and be maintained in a manner that provides protection for project personnel from shock hazards, injury, and prevents property damage. Ground-fault protection will be provided whenever outdoor electrical equipment is used.

- Keep all ignition sources at least 15 m (50 ft) from explosive or flammable environments and use nonsparking, explosion-proof equipment if advised to do so by a safety professional.

- Personnel working in the exclusion or controlled access zone will implement the "buddy system" (see Section 6.5 of this HASP).

- Proceed directly to a radiological survey station upon leaving a radionuclide-contaminated zone. Care should be taken not to touch the face, mouth, and eyes before a survey has been performed.

- Personnel who wear contact lenses will comply with the *Safety and Health Manual 14A*, MCP-2716, "Personal Protective Equipment."

6.3 ALARA Principles

Radiation exposure of project personnel will be controlled such that radiation exposures are well below regulatory limits, and there is no radiation exposure without commensurate benefit. Unplanned and preventable exposures are considered unacceptable. All project tasks will be evaluated with the goal of eliminating or minimizing exposures. Following ALARA principles and practices is the responsibility of all project personnel. All personnel working at the site must strive to keep both external and internal radiation doses ALARA by adopting the following practices.

6.3.1 External Radiation Dose Reduction

- Sources for external radiation exposure are present at OU 5-12 RD/RA project sites. Basic protective measures used to reduce external doses include minimizing time in radiation areas, maximizing the distance from the source of radiation, and using shielding whenever possible.

6.3.2 Internal Radiation Dose Reduction

- An internal radiation dose potential exists at most OU 5-12 RD/RA project sites from radionuclide contamination. An internal dose is a result of radioactive material being taken into the body. Radioactive material can enter the body through inhalation, ingestion, absorption through wounds, or injection from a puncture wound. Reducing the potential for radioactive material to enter the body is critical to avoid internal dose.

6.4 Nonradiological Contaminant Exposure Avoidance

The same potential exposure pathways that exist for radionuclide contamination apply equally to the OU 5-12 RD/RA project nonradionuclide contaminants detailed in the project-specific appendices. Each contaminant has distinct physical, chemical, and mechanical properties that determine its toxicity. Threshold-limit values (TLVs) have been established to provide guidelines in evaluating airborne and

skin exposure to these chemicals and materials. They represent levels and conditions under which it is believed that nearly all workers may be exposed day after day without adverse health effects.

The engineering controls employed to eliminate or mitigate airborne radioactivity will serve to control nonradiological airborne contaminants. Every effort will be made to isolate the source of these hazards through engineering controls and containment where feasible. Some of these contaminants pose other exposure hazards from contact and skin absorption, and the implementation of avoidance practices will serve to minimize the potential for exposures. Some methods of exposure avoidance at the site include:

- Ensuring all high-efficiency particulate air (HEPA) systems are operating when they must be opened or handled
- Collecting bags to isolate the source of contamination
- Wearing all required PPE, inspecting all pieces before donning, and taping all seams
- Changing gloves frequently (when soiled) to prevent the spread of contamination
- Changing PPE if it becomes damaged or soiled with source contaminant material (sludge or waste residue)
- Containerize samples to avoid handling twice
- Minimize time in known or suspected contamination areas (such as vapors, sludge, or waste residue)
- Doff PPE in a manner that prevents the potential spread of contamination to clean areas
- Wash hands and face before eating, drinking, smoking, or any other activity that may provide a pathway for contaminants.

6.5 The Buddy System

The "buddy system" will be used at the site when personnel have entered into the EZ. The buddy system requires each employee to assess and monitor his or her buddy's mental and physical well being during the course of the workday. A buddy must be able to do the following:

- Provide assistance
- Verify the integrity of PPE
- Observe their partner for signs and symptoms of heat stress, cold stress, or contaminant exposure
- Notify other personnel in the EZ if emergency assistance is needed.

Workers need to be able to see or hear and effectively communicate with their buddy at all times when in the EZ.

7. SITE CONTROL AND SECURITY

Based on the known, expected, and potential levels of radionuclide and chemical contamination present in the waste at the site, work zones/radiological areas will be established for the site. Entry into and exit out of site work zones will be controlled through the appropriate use of barriers, signs, and other measures that are described in detail in this section (refer to the *Safety and Health Manual,* MCP-2714). Personnel not directly involved with activities will be excluded from entering work zones. Nonworkers, such as inspectors, may be admitted to the site provided they are on official business; escorted by the HSO, FTL, or CC; and have demonstrated compliance with the training requirements in Section 4 of this HASP.

Note: *The HSO, IH, and RadCon personnel will assist the FTL, CC, and JSS in establishing the appropriate work zones based on the IH EA, site characterization, and RadCon radiological evaluations.*

Both radiological and nonradiological hazards (including industrial safety hazards) will be evaluated when establishing the initial zone locations and size. For site-specific zone postings, see project-specific appendices. Common barriers may be used to delineate both radiological and nonradiological work-zone postings, depending on the nature and extent of contamination. If common barriers are used, they will be delineated and posted according to both sets of requirements (29 CFR 1910.120 and 10 CFR 835) using appropriate colored rope and postings. These zones may change in size and location as project tasks evolve, based on site monitoring data, and as wind direction changes. Additionally, entrance and egress points may change based on these same factors. Work zones may include:

- Exclusion Zones (EZs)
- Contamination Reduction Zones (CRZs)
- Contamination Reduction Corridor (CRC)
- Support Zone (SZ).

7.1 Exclusion Zone

The EZ will be large enough to encompass all work areas. The minimum number of personnel required to safely perform the project tasks will be allowed into the EZ. The EZ is a controlled access zone at all times. An entry and exit point will be established at the periphery of the EZ/CRC to regulate the flow of personnel and equipment. A sign-in board or log will be used to track entry in and exit out of the EZ. The EZ boundary will be delineated with rope or printed hazard ribbon. For site-specific information regarding the exclusion zone, see the applicable project-specific appendix.

Note: *Nonsite personnel are not permitted in the EZ without proper escort and satisfying the appropriate training requirements for being in the EZ.*

Factors that will be considered when establishing the EZ boundary include: air monitoring data, radionuclide-contamination data, radiation fields, equipment in use, the physical area necessary to conduct site operations, and the potential for contaminants to be blown from the area. The boundary may be expanded or contracted, as this information becomes available, based on the aforementioned evaluations.

Radiologically-controlled areas will be established, as determined appropriate by RadCon personnel in conjunction with the EZ, to restrict the movement of personnel and equipment to prevent the potential spread of contamination. These areas may include a contamination area (immediately around the work area activities), step-off pad for exiting the contamination area, and radiological buffer area (RBA) around the entire contamination area and step-off area. All contaminated and potentially contaminated PPE will be containerized and stored in the contamination area until fully characterized. All items (including PPE, equipment, and debris) generated during the radiological decontamination process will be characterized in compliance with MCP-444, "Characterization Requirements for Solid and Hazardous Waste," as described in Section 10, Decontamination.

No equipment will be released from the contaminated area until a comprehensive radiological survey has been completed (hand-held instruments and swipes) in accordance with MCP-139, "Radiological Surveys," and has met the radiological-specific free release criteria described in DOE Order 5400.5, Section II-5(c) and listed on Figure IV-1 (5400.5).

All personnel who enter the EZ will wear the appropriate level of PPE for the degree and type of hazards present as listed in the appropriate project-specific appendix, radiological work permit, and safe work permit. When Level B activities are taking place, standby personnel will be stationed just outside the area to respond to events. These responders will don a portion of the same Level B protective clothing as the worker inside the contaminated area and will have the remaining required respiratory protection and protective clothing ensemble in the immediate area. The number of standby personnel will be determined on a task-by-task basis by the project HSO.

7.2 Contamination Reduction Zone and Corridor

The project CRZ and CRC are transition areas surrounding the EZ and are located between the EZ and SZ. The CRZ and CRC will serve to buffer and further reduce the probability of the SZ becoming contaminated. The CRC will encompass an area large enough to allow for necessary equipment to travel through. All project personnel and equipment entering and exiting the EZ will transition through the CRC. Physical transfer of contaminating substances on personnel, equipment or in the air will be minimized through restricting traffic to these controlled areas. The CRZ and CRC may serve as staging areas for equipment and temporary rest areas for personnel. Because of the potential for contamination (migration from airborne contamination in the EZ), PPE and sample packaging and preparation equipment will be stored in the SZ. For project-specific information regarding the CRC and CRZ, refer to the appropriate project-specific appendix.

Note: *Nonsite personnel are not permitted in the CRZ without proper escort and satisfying the appropriate training requirements for being in the CRZ.*

The project IH will be responsible for nonradionuclide-contamination issues and determining the most appropriate decontamination methods, as described in Section 10. A designated portion of the CRC will be established for the nonradionuclide decontamination of equipment (if required). All decontamination supplies (nonradionuclide decontamination solution and Teri wipes) and used nonradiological PPE and debris waste containers may be located in the CRC.

7.3 Support Zone

The SZ will be considered a radiological and nonradiological "clean" area. The location of the SZ will be upwind of the EZ (where possible) and readily accessible to the nearest road. The SZ is a controlled area outside the CRZ. Support facilities (project management and RadCon trailers), project

command center, vehicle parking, additional emergency equipment, extra PPE, and stored monitoring and sampling equipment may be located in the SZ. For project-specific information regarding the Support Zone, refer to the appropriate project-specific appendix.

7.4 Designated Eating and Smoking Area

Ingestion of hazardous substances is likely when workers do not practice good personal hygiene habits. It is important to wash hands, face, and other exposed skin thoroughly after completion of work and before smoking, eating, drinking, and chewing gum or tobacco. No smoking, chewing, eating, drinking or applying lip balm, sunscreen, or lotion is allowed within the site work zones. An eating area will be established in a clean area outside of the contamination area, EZ, CRZ, or CRC. All personnel who enter into the contaminated area must survey upon leaving as directed by the radiological work permit. As a minimum, all personnel will wash their hands prior to using designated eating or smoking areas.

Personnel will not be permitted to smoke in any of the site work zones (EZ, CRZ, CRC, or SZ) and will use only approved smoking areas. All INEEL smoking polices will be complied with, including disposing of smoking materials in the proper receptacle.

8. HAZARD ASSESSMENT

The overall objectives of this hazards assessment section are to provide guidance on the following:

- Evaluation of field activities where intrusive activities will occur to determine the radiological, chemical, and biological exposure potential to project personnel by all routes of entry
- Evaluation of all project tasks to determine the extent that existing radiological, chemical, and physical hazards may potentially impact site personnel
- Establishment of the necessary monitoring and sampling required to continuously evaluate exposure and contamination levels, determine adequate action levels to mitigate potential exposures, and provide specific actions to be followed if action levels are reached
- Engineering control determination, isolation methods for mixed waste contamination from personnel, work practices to limit personnel exposure, administrative controls, and appropriate respiratory protection and protective clothing to protect site personnel from hazards.

8.1 OU 5-12 RD/RA Site Activities

Personnel may be exposed to safety hazards, chemical, radiological, and physical agents while working at the OU 5-12 RD/RA project sites. The magnitude of these hazards to personnel entering the work zones is dependent on both the chemical/radiological nature of the contaminants encountered and the intrusive tasks being performed. Engineering controls will be implemented (whenever possible), along with adequate work practices, real-time monitoring of contaminants, and site-specific hazard training to further mitigate potential exposures and hazards.

For specific information regarding the Hazards Assessment for OU 5-12 RD/RA site activities, refer to the applicable task-specific appendix. Each appendix presents a site-specific evaluation of the radiological and nonradiological contaminants with respect to potential routes of exposure and symptoms of overexposure. Additionally, the exposure potential by all routes is stated based on quantity of material present and toxicity.

The safe work permits and radiological work permits will be used in conjunction with this HASP to address hazardous and radiological conditions at each site. These permits will augment this HASP and further detail specialized protective equipment and dosimetry requirements.

The IH and radiological monitoring are outlined in Sections 8.4.1 and 8.4.2, respectively.

8.2 Routes of Exposure

Exposure pathways for hazardous materials and radionuclides are directly related to the nature of project tasks. Engineering controls (HEPA filtration), continuous monitoring, training, and work controls will mitigate potential contact and uptake of these hazards; however, the potential for exposure to contaminants still exists. Exposure pathways include:

- Inhalation of radiologically contaminated organic compounds and fugitive dusts during intrusive activities and decontamination tasks. This contamination form may have trace

amounts of inorganic compounds and be contaminated with radionuclides resulting in potential lung deposition.

- Skin absorption and contact with radiologically contaminated organic and inorganic compounds that can be absorbed through unprotected skin or corrosion, resulting in chemical burns, uptake through skin absorption and/or skin contamination.

- Ingestion of radiologically contaminated organic and inorganic compounds adsorbed to dust particles or waste residues, uptake of contaminants through the gastrointestinal (GI) tract that results in GI irritation, internal tissue irradiation, and/or deposition to target organs.

- Injection while handling radiologically contaminated organic and inorganic materials by breaking of the skin or migration through an existing wound resulting in localized irritation, contamination, uptake of soluble contaminants, and deposition of insoluble contaminants.

8.3 Environmental and Personnel Monitoring

The potential for exposure to radiological and nonradiological hazards exists during many of the tasks that will take place at the OU 5-12 RD/RA project sites and affects all personnel who work in the CRZ and EZ. Refinement of work controls zones (Section 7), engineering and administrative controls, worker training, and the use of protective equipment will mitigate most of these hazards to a large degree. Monitoring with direct-reading instruments will be conducted to provide RadCon and IH personnel with real-time data to assess the effectiveness of these controls.

The IH and RadCon personnel will focus on the activities and monitor with direct-reading instrumentation, swipes, and full and partial period air sampling in accordance with the applicable technical procedures and other guidelines, as deemed appropriate. Other workers and areas of the site will also be monitored to ensure contamination has not migrated from radiologically contaminated material areas or waste containers and to determine the effectiveness of contamination control and decontamination practices.

8.3.1 Industrial Hygiene Monitoring

All full and partial period airborne contaminant sampling will be conducted using applicable NIOSH or OSHA methods and in conformance with the INEEL *Safety and Health Manual*. Risk assessments for site personnel will be conducted according to the INEEL *Safety and Health Manual*, MCP-153, "Industrial Hygiene Exposure Assessment."

An American Conference of Governmental Industrial Hygienists-TLV "skin" notation indicates that a potential significant contribution to the overall exposure may be by the coetaneous route. This includes the mucous membranes and the eyes, either by contact with vapors or if permeation or damage to PPE occurs by direct skin contact with the substance. Therefore, use of protective clothing and monitoring, as determined by the project IH, will be of critical importance.

When there is a potential for the spread of contamination, monitoring for surface radionuclide contamination may provide an additional indicator of nonradiological hazards. Various direct-reading instruments and other semiquantitative detection tests may be used to determine the presence of nonradiological and other physical agents. The frequency and type of sampling and monitoring will be determined by the IH based on changing site conditions, direct-reading instrument results, observation,

and professional judgement. Various instruments and sampling methods will be used by the project IH (as deemed appropriate).

All monitoring instruments will be maintained and calibrated in accordance with the manufacturer's recommendations, existing IH protocol, and in conformance with the INEEL Safety and Health Manual. Direct-reading instruments will be verified, at a minimum, prior to daily use and more frequently as determined by the project IH. Calibration information, sampling and monitoring data, results from direct-reading instruments, and field observations will be recorded per Section 3.

8.4 Physical Hazards Evaluation, Control, and Monitoring

The physical hazards present at the project task sites and the methods that will be used to monitor and control them are described in this section. It is critical that all personnel are aware and understand the nature of the tasks that will be conducted, the equipment to be used, and the controls in place to eliminate or mitigate potential safety hazards.

8.4.1 Temperature Extremes

Project activities will be conducted during months where there is a potential that both heat and cold stress factors could affect task-site personnel based on ambient air temperatures and layered PPE.

8.4.1.1 Heat Stress. Outside temperatures are expected to be variable during project activities, and personnel will be required to wear protective clothing that prevents the body from cooling. High ambient air temperatures can result in increased body temperature, heat fatigue, heat exhaustion, or heat stroke that can lead to symptoms ranging from physical discomfort, unconsciousness, to death. Personnel must inform the FTL CC, or HSO when experiencing any signs and/or symptoms of heat stress, or observe a fellow employee ("buddy") experiencing them. The INEEL *Safety and Health Manual*, MCP-2704, "Heat and Cold Stress," and Table 8-1 of this section describe heat stress hazards further.

Monitoring for heat stress conditions will be performed according to the INEEL *Safety and Health Manual,* MCP-2704, "Heat and Cold Stress." Depending on the ambient weather conditions, work conditions, type of PPE worn, and the physical response of work operations personnel, the IH/RCT will inform the FTL and CC of necessary adjustments to the work/rest cycle. Additionally, physiological monitoring may be conducted to determine if personnel are replenishing liquids fast enough. A supply of cool drinking water will be provided in designated eating areas and consumed only in these areas. The IH/RCT or HSO may periodically interview workers to ensure that the controls are effective and that excessive heat exposure is not occurring. Workers will be encouraged to monitor their body signs and to take breaks if symptoms of heat stress occur. Table 8-1 of this section further describes heat stress hazards.

Individuals showing any of the symptoms of heat exhaustion listed in Table 8-1 will: (1) stop work, (2) exit work area, (3) be decontaminated, as appropriate, (4) remove protective clothing, (5) move to sheltered area to rest, (6) be provided cool drinking water, and (7) be monitored by a medic or CPR/first aid-certified employee.

Note: *Heat exhaustion and heat stroke are extremely serious conditions that can result in death and should be treated as such. Transport individual immediately to the nearest medical facility.*

Table 8-1. Heat stress signs and symptoms.

Heat-Related Illness	Signs and Symptoms	Emergency Care
Heat rash	Red skin rash and reduced sweating	Keep the skin clean; change all clothing daily; cover affected areas with powder containing cornstarch or with plain cornstarch.
Heat cramps	Severe muscle cramps, exhaustion, sometimes with dizziness or periods of faintness	Move the patient to a nearby cool place; give the patient half-strength electrolytic fluids; if cramps persist, or if more serious signs develop, seek medical attention.
Heat exhaustion	Rapid, shallow breathing; weak pulse; **cold, clammy skin; heavy perspiration**; total body weakness; dizziness that sometimes leads to unconsciousness	Move the patient to a nearby cool place; keep the patient at rest; give the patient half-strength electrolytic fluids; treat for shock; seek medical attention. **DO NOT TRY TO ADMINISTER FLUIDS TO AN UNCONSCIOUS PATIENT**
Heat Stroke	Deep, then shallow, breathing; rapid, strong pulse, then rapid, weak pulse; **dry, hot skin**; dilated pupils; loss of consciousness (possible coma); seizures or muscular twitching	Cool the patient rapidly. Treat for shock. If cold-packs or ice bags are available, wrap them and place one bag or pack under each armpit, behind each knee, one in the groin, one on each wrist and ankle, and one on each side of the neck. Seek medical attention as rapidly as possible. Monitor the patient's vital signs constantly. **DO NOT ADMINISTER FLUIDS OF ANY KIND**

8.4.1.2 Low Temperatures. Exposure to low temperatures will likely be a factor during the time of project activities and can be at other times of the year if the conditions are right. Relatively cool ambient temperatures and wet or windy conditions increase the potential for cold injury to personnel. The project IH and HSO will be responsible for obtaining meteorological information to determine if additional cold stress administrative controls are required. The INEEL *Safety and Health Manual*, MCP-2704, "Heat and Cold Stress," discusses the hazards and monitoring of cold stress. Project personnel will also be cautioned regarding cold stress factors associated with rapid cooling once impermeable PPE layers are removed causing the potential for freezing of accumulated moisture on the outer and inner surfaces of PPE (under extremely cold conditions). Workers should wear layered warm clothing, such as heavy socks and hooded garments, when the air temperature is below 40 to 45°F (4 to 7°C).

When the air temperature is 30 to 40°F (-1 to +4°C), workers should wear clothing for warmth as well as chemical protective clothing. This may include:

- Cold Stress
  - Insulated suits, such as whole-body thermal underwear
  - Wool or polypropylene socks to keep moisture off the feet if there is a potential for work activity that could cause sweating

- Insulated glove liners when air temperatures are extremely low (less than 5 to 10°F [-12 to -15°C]), gloves with reflective surfaces, which reflect body heat back to the hand, should be used)

- Insulated boots and head cover, such as hard hat liners.

- At air temperatures below 30°F (-1°C), the following work practices should be followed:

  - If the clothing of a worker might become wet on a job site, the outer layer of the clothing must be impermeable to water

  - If a worker's underclothing becomes wet, the worker must change into dry clothing immediately; however, if the clothing becomes wet from sweating, the worker may finish the task that caused the sweating before changing into dry clothing

  - Workers will be provided a warm area (65°F [18.3°C] or above) to change from work clothing into street clothing

  - Workers will be provided a warm break area (60°F [15.6°C] or above)

  - If appropriate, space heaters may be provided in the work area to warm the hands and feet

  - Hot liquids, such as soups or sweet drinks, will be provided in the break area; caffeine intake should be limited because of diuretic and circulatory system effects

  - The buddy system will be practiced at all times; any personnel observed with severe shivering will leave the cold area immediately

  - Workers should layer their clothing (i.e., thinner, lighter clothing layered under heavier clothing)

  - Workers handling liquids that evaporate easily (such as gasoline and diesel fuel) should take special precautions to avoid soaking clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling

  - Work should be planned to minimize the need for workers to sit still or stand for long periods of time.

Additional cold weather hazards exist from working on snow- or ice-covered surfaces. Slip, fall, and material handling hazards are increased under these conditions. Every effort must be made to ensure that walking surfaces are kept clear of ice. The CC or HSO should be notified immediately if slip or fall hazards are noted at the site.

8.4.2 Noise

Personnel working at the task site may be exposed to noise levels that exceed 85 decibels A-weighted (dBA) for an 8-hour time weighted average (TWA) and 83 dBA for a 10-hour TWA. The effects of high sound levels (noise) may include the following:

- Personnel being startled, distracted, or fatigued
- Physical damage to the ear, pain, and temporary or permanent hearing loss
- Interfere with communication that would warn of danger.

Noise measurements will be performed by the IH per MCP-2719, "Hearing Conservation Program," to determine if personnel assigned to the jobs identified are above allowable noise exposure levels. A TLV of 85 dBA (time-weighted average) will be applied to personnel exposed to noise levels over no more than an 8-hour day. This level is based on a 16-hour "recovery" period in a low noise environment. If personnel are required to work longer than 8 hours in a hazardous noise environment, then the TLV will be adjusted to a lower value. The project IH must be consulted regarding modifications to the 85 dBA for 8-hour TLV and 83 dBA for 10-hour TWA value.

Personnel whose noise exposure meets or exceeds the allowable level will be enrolled in the INEEL OMP or subcontractor Hearing Conservation Program. Personnel working on jobs that have noise exposures greater than 85 dBA (83 dBA for 10-hour TWA) will be required to wear hearing protection until noise levels have been evaluated and will continue to wear the hearing protection specified by the IH until directed otherwise.

8.4.3 Fire, Explosion, and Reactive Materials Hazards

Fires, explosions, and reactive materials hazards at the task site include potential explosive atmospheres, combustible materials near ignition sources (hot motors or exhaust systems), transfer and storage of flammable or combustible liquids in the SZ, and chemical reactions (reduction, oxidation, and exothermic) from incompatible waste materials. Portable fire extinguishers with a minimum rating of 10A/60BC must be strategically located at the site to combat Class ABC fires. They will be located in all active work areas, on or near site equipment that has exhaust heat sources, and all equipment that is capable of generating ignition or has the potential to spark. Additionally, 30-pound Class D (combustible metals) portable extinguishers will be located inside the contaminated area in the unlikely event of a combustible metal fire.

8.4.3.1 Project Equipment Fire Hazards. Combustible or ignitable materials in contact with or near exhaust manifolds, catalytic converters, or other ignition sources could result in a fire. The HSO will work with the project fire protection engineer to identify these sources as equipment is brought on the site. The accumulation of combustible materials will be strictly prohibited. Disposal of combustible materials will be assessed at the end of each shift. Class A combustibles such as trash, cardboard, rags, wood, and plastic will be properly stored.

Fuel and other flammable/combustible liquids used at the task site will be safely stored, handled, and used. Only FM/UL-approved flammable liquid containers, labeled with the content per Haz Com requirements, will be used to store flammable/combustible liquids. All flammable liquid containers will be stored at least 15 m (50 ft) from any facilities (trailers) and ignition sources or stored inside an approved flammable storage cabinet. Additional requirements are provided in the INEEL *Safety and*

Health Manual, MCP-584, "Flammable/Combustible Liquids." Before fueling, portable motorized equipment, such as generators and light plants, will be shut off and allowed to cool down in accordance with the manufacturer's operating instructions to minimize the potential for a fuel fire. Refueling tasks will only be conducted by qualified fuel handling personnel.

8.4.4 Biological Hazards

The OU 5-12 project sites are located in areas that provide habitat for various rodents, insects and reptiles. Based on biological studies done at the INEEL, deer mice have been known to carry the hantavirus. The virus is present in the nesting and fecal matter of deer mice. A potential exists for project personnel to disturb nesting or fecal matter during the course of mobilization and intrusive activities. If such materials are disturbed, they can become airborne and create a potential inhalation pathway for the virus. Also, contact and improper removal of these materials may provide additional inhalation exposure risks.

If suspect rodent nesting or excrement material is encountered, the FTL/CC, IH, and HSO will be notified immediately and no attempt will be made to remove or clean the area. Following an evaluation of the area, a SWP will be written for disinfecting and removing it from the project task area. The IH will provide the necessary guidance for protective equipment, mixing, and application of the disinfecting solution (bleach solution), and proper disposal method of the waste. Typical PPE for disinfecting and removing a large nesting area may include full-face respirator with a HEPA filter cartridge, Tyvek coveralls, outer booties, and two pairs of gloves (latex inner-nitrile outer). Generally, all seams and mating/overlapping PPE ensemble pieces will be taped.

Snakes, insects, and arachnids (spiders, ticks, and mosquitoes) may also be encountered at the site. Common areas to avoid include material stacking/staging areas, under existing structures (trailers and buildings), under boxes, and other areas that provide shelter for snakes. Protective clothing will prevent insects from direct contact with personnel; however, repellant (DEET or equivalent) may be required during Level D activities. Areas where standing water has accumulated provide breeding grounds for mosquitoes and should be avoided. In cases where large areas of standing water is encountered, it may be necessary to pump it dry or add a small concentration of nonhazardous surfactant to the water to break the surface tension (mosquito hatching phases). Consult with the environmental coordinator before adding surfactant to standing water areas.

8.4.5 Confined Spaces

Work in confined spaces may subject personnel to risks involving engulfment, entrapment, oxygen deficiency, and toxic or explosive atmospheres.

If a suspected confined space is discovered and not properly posted, it will be treated as a permit required confined space until a determination is made by an assigned safety/IH professional. Entrances will be posted with the required danger or caution sign per the *Safety and Health Manual,* MCP-2749, "Confined Spaces." A confined space entry permit and proper training is required before an employee can enter a confined space.

8.4.6 Safety Hazards

Industrial safety hazards pose a significant, if not the most likely, threat to personnel that will be encountered while performing tasks at the project sites. Section 6 provided general safe-work practices

that must be followed at all times. The following sections describe specific industrial safety hazards and procedures to be followed to eliminate or minimize potential hazards to project personnel.

8.4.6.1 Handling Heavy Objects. Handling and maneuvering various pieces of equipment may result in employee injury. Manual material handling will be minimized through task design and use of mechanical and/or hydraulic lifts whenever possible.

8.4.6.2 Powered Equipment and Tools. At the project, radiological release surveys will determine what equipment can leave the contaminated area. All power equipment and tools will be properly maintained and used by qualified individuals according to the manufacturer's specifications. The INEEL *Safety and Health Manual*, MCP-2735, "Hand and Portable Power Tools," will be followed for all work performed with powered equipment including powered steam cleaners.

8.4.6.3 Heavy Equipment and Moving Machinery. The hazards associated with the operation of heavy equipment include injury to personnel, equipment damage, and/or property damage. All heavy equipment will be operated in the manner in which it was intended and according to manufacturer's instructions. Only authorized personnel will be allowed in the vicinity of operating heavy equipment and should maintain visual communication with the operator. Work-site personnel will comply with the INEEL *Safety and Health Manual*, MCP-2745, "Heavy Industrial Vehicles," MCP-2743, "Motor Vehicle Safety," and MCP-2744, "Powered Industrial Trucks."

Site personnel working around or near heavy equipment and other moving machinery will comply with the appropriate INEEL *Safety and Health Manual* MCPs and DOE-STD-1090-96, *Hoisting and Rigging.* Safe practices include:

- All heavy equipment will have backup alarms.
- Walking directly in back of or to the side of heavy equipment without the operator's knowledge will be prohibited; all precautions will have been taken prior to moving heavy equipment.
- While operating heavy equipment in the work area, the equipment operator will maintain communication with a designated person responsible for providing direct voice contact or approved standard hand signals; in addition, all site personnel in the immediate work area will be made aware of the equipment operations.
- All equipment will be kept out of traffic lanes and access ways and will be stored so as not to endanger personnel at any time.

8.4.6.4 Electrical Hazards/Energized Systems. Electrical equipment and tools as well as power distribution lines may pose shock or electrocution hazards to personnel. Safety-related work practices will be employed to prevent electric shock or other injuries resulting from direct or indirect electrical contact. If work on energized systems is necessary, these practices will conform with the requirements in the INEEL *Safety and Health Manual*, MCP-2731, "Electrical Safety," PRD-5051/MCP-3650 "Lockouts and Tagouts," and Parts I through III of NFPA 70E. In addition, all electrical work will be reviewed and completed under the appropriate work controls (i.e., safe work permits, work orders, job safety analyses).

Before beginning any subsurface penetrations, underground utility clearances will be obtained. Subsurface investigation clearance will be obtained in accordance with *Facilities and Maintenance*

Manual, MCP-151, "Subsurface Investigations." The requirements for advanced 48-hour notice will be met.

8.4.6.5 Personal Protective Equipment. Wearing PPE will reduce a worker's ability to move freely, see clearly, and hear directions and noise that might indicate a hazard. Also, PPE can increase the risk of heat stress. Work activities at the task site will be modified, as necessary, to ensure that personnel are able to work safely in the required PPE. Work-site personnel will comply with INEEL *Safety and Health Manual*, MCP-2716, "Personal Protective Equipment," and *Radiation Protection Manual*, MCP-432, "Radiological Personal Protective Equipment."

8.4.6.6 Excavations. Excavations can pose significant hazards such as falls, engulfment, hazardous atmospheres, and overhead hazards. Safe work in and around excavations will meet all of the applicable requirements of 29 CFR 1926 Subpart P and MCP-2733.

8.4.7 Inclement Weather Conditions

When inclement or adverse weather conditions develop that may pose a threat to personnel or property at the task site, such as sustained strong winds (25 mph or greater), electrical storms, heavy precipitation, or extreme heat or cold, conditions will be evaluated. A decision will be made by the FTL, CC or JSS, with input from the HSO, IH, SE, RCT, and other personnel, as appropriate, to stop work, employ compensatory measures, or to proceed. Project personnel will comply with INEEL MCPs and site work control documents that specify limits for inclement weather.

8.4.8 Dust Control

During all site activities, project RadCon and IH personnel will determine if wind or other weather conditions pose unacceptable exposure hazards to personnel or the environment. Methods such as surfactants, wetting, and enclosures may be used to assist with dust control. Administrative controls such as designating routes of travel or restricting access to areas may also be implemented.

8.5 Other Site Hazards

Site personnel should continually look for potential hazards and immediately inform the CC or HSO of the hazards so that action can be taken to correct the condition.

The FTL, CC, and HSO will conduct daily inspections of the task site to ensure that barriers and signs are being maintained, unsafe conditions are corrected, and debris is not accumulating on the site. These inspections will be noted in the FTL or CC logbook. Health and safety professionals present at the task site may, at any time, recommend changes in work habits to the FTL or CC. However, all changes that may affect the project written work control documents (HASP, radiological work permits, and safe work permits), must have concurrence from the appropriate project technical discipline representative onsite and a document action request (DAR) prepared as required.

Personnel working at the task site are responsible to use safe-work techniques, report unsafe working conditions, and exercise good personal hygiene and housekeeping habits throughout the course of their job.

9. PERSONAL PROTECTIVE EQUIPMENT

The OU 5-12 RD/RA sites pose significant potential hazards to personnel. Anyone entering the CRZ and EZ must be protected against these potential hazards. The purpose of PPE is to shield or isolate personnel from chemical, radiological, physical, and/or biological hazards that cannot be eliminated though engineering or other controls and may be encountered at the site. It is important to realize that no PPE ensemble can protect against all hazards under all conditions and that work practices and adequate training will also provide a greater level of protection to workers.

Note: *For upgrading or downgrading PPE, the CC, FTL, and HSO must involve the IH, RCT, and/or the RE before any changes are made.*

Selection of the proper PPE to protect site personnel is based on the following:

- Project tasks to be conducted
- Known or suspected radiological and nonradiological materials and agents expected to be found at the task site
- Potential contaminant routes of entry
- Physical form and chemical characteristics of contaminants
- Acute and chronic effects from exposure to contaminants
- Local and systemic toxicity of contaminants
- Anticipated exposure levels (surface and airborne)
- The Hazard Analysis (Section 8) evaluation of this HASP.

Anti-contamination (Anti-C) requirements are dictated by the radiological work permit in conformance with INEEL *Radiation Protection Manual*, MCP-432, "Personal Protective Equipment."

PPE is generally divided into two broad categories: (1) respiratory protective equipment and (2) personal protective clothing. Both of these categories are incorporated into the standard four levels of protection (Levels A, B, C, and D), based on the potential severity of the project hazards. Tables 9-1 and 9-2 provide guidance in the selection and inspection process for respiratory and protective clothing. Refer to the applicable project-specific appendix for project-specific information on PPE requirements.

9.1 Personal Protective Equipment Levels

The following sections provide detail and explanation of the four levels of PPE. Modifications to these levels will be made under the direction of the HSO in consultation with the project IH and RadCon personnel, as appropriate. Such modifications are routinely employed during HAZWOPER site activities to maximize efficiency and to meet site-specific needs without compromising personnel safety and health. Special attention will be given to both respiratory and protective clothing modifications to meet specific task requirements due to potential contamination that will be encountered at the project sites. The HSO, IH, and RadCon personnel will determine what modifications are appropriate to the PPE levels.

Table 9-1. Respiratory and protective clothing selection.

Hazard	Level of Protection
Respiratory PPE Selection [a]	
Not immediately dangerous to life or health (IDLH) or oxygen deficient atmospheric conditions. Gaseous, vapor, particulate and/or aerosol chemicals/radionuclides.	Level C—full-facepiece, as determined by IH/RadCon Level B—full-facepiece supplied air respirator with an air-purifying escape cartridge or airhood (bubblehood) HEPA/chemical combination cartridge for concentrations up to the protection factor of an air-purifying full-facepiece respirator and within the assigned DAC[b] value
IDLH or oxygen deficient atmospheric conditions. Gaseous, vapor, particulate and/or aerosol chemicals/radionuclides.	Level B—full-facepiece, supplied air respirator with an escape-only SCBA[c] or Level A—self-contained breathing apparatus HEPA/chemical combination cartridge for concentrations up to the protection factor of an air-purifying full-facepiece respirator and within the assigned DAC [b] value
Protective Clothing Selection	
Low atmospheric contaminant levels that are present under stable conditions. No anticipated immersion, splashes or potential for unexpected contact with chemical or radiological contaminants.	Level D
Moderate atmospheric contaminants under relatively stable conditions, liquid splashes or other direct contact that do not have corrosive characteristics or can be absorbed by exposed skin. Low radionuclide contamination and airborne radioactivity levels.[d]	Level C
Moderate to high atmospheric contaminants under unstable conditions, potential for contact with wet, contaminated surfaces/material that can saturate or permeate Level C protective clothing. Moderate radionuclide contamination and airborne radioactivity levels.[d]	Level B
High and unknown atmospheric contaminants, potential for contact with substances that pose a high hazard potential to the skin, high potential for splash, immersion or exposure to unexpected vapors, gases, aerosols, or dusts that may present an IDLH situation/readily absorbed through the skin. High radionuclide contamination and airborne radioactivity levels.[d]	Level A

a. A multichemical/HEPA combination cartridge to be selected by IH and RadCon personnel based on specific task hazards.

b. Derived air concentration (DAC) based on specific radionuclides.

c. SCBA = self-contained breathing apparatus.

d. Contamination levels and airborne radioactivity as defined by 10 CFR 835.603.d.

9.1.1 Level D Personal Protective Equipment

Level D PPE will only be selected as a work uniform and not on a site with respiratory or skin absorption hazards requiring whole body protection. It provides no protection against airborne chemical hazards, but rather is used for protection against nuisance contamination and physical hazards. Level D PPE will only be allowed in areas that have been characterized or are known never to have been contaminated.

Basic Level D PPE consists of the following:

- Coveralls or work clothes (as determined by the IH and/or RCT)
- Hard hat (as required by SE and type of work being performed)
- Eye protection, safety glasses with side shields as a minimum (see *Safety and Health Manual,* MCP-2716, "Personal Protective Equipment")
- Safety footwear (steel or protective toe and shank, as determined by the SE).

Optional Level D Modifications consist of the following:

- Chemical or radiological protective clothing (Tyvek and Saranex) as prescribed in the site-specific radiological work permit or safe work permit
- Chemically resistant hand and foot protection (inner/outer gloves and boot liners)
- Radiological modesty garments under outer protective clothing
- Any specialized protective equipment (hearing protection, cryogenic gloves, face shields, welding goggles, and aprons).

9.1.2 Level C Personal Protective Equipment

Level C PPE will be worn when the task site chemical and/or radiological contaminants have been well-characterized indicating that personnel are protected from airborne exposures by wearing as air-purifying respirators (APRs) with the appropriate cartridges, no oxygen-deficient environments exist (<19.5% at sea level), and that there are no conditions that pose IDLH. Basic Level C PPE includes:

- Level D ensemble with the following respiratory and whole body protection upgrades:
  - Full-facepiece APR equipped with a NIOSH approved HEPA/chemical combination cartridge (IH to specify chemical combination cartridge)
  - Chemical-resistant coveralls (Tyvek QC®, Tychem 7500®, Saranex-23-P™) as prescribed in site-specific radiological work permit or safe work permit (IH to specify material)
  - Chemical-resistant outer shoe/boot cover (IH and/or RCT to specify material)

- Inner chemical-resistant nitrile rubber gloves with cotton liners (as determined by the IH and/or RCT)

- Outer chemical-resistant Viton or polyvinyl alcohol (PVA) gloves (as determined by the IH).

- Optional Level C Modifications:

  - Radiological modesty garments under outer protective clothing

  - Any specialized protective equipment (hearing protection, welding lens, and aprons).

9.1.3 Level B Personal Protective Equipment

Level B PPE will be worn when personnel cannot be adequately protected with APRs because there are high levels of contaminants present, the appropriate respirator cartridges or combination are not available, a significant hazard exists for skin exposure, or IDLH/oxygen-deficient conditions exist. If IDLH conditions do not exist, then an escape air-purifying cartridge may be substituted for the escape bottle. Level B PPE includes:

- Level C ensemble with the following respiratory and whole body protection upgrades:

  - An airhood operating at a minimum pressure of 6 cfm or a full-facepiece supplied air respirator with a 10-minute escape bottle, a self-contained breathing apparatus (SCBA), or an escape air-purifying combination HEPA/chemical cartridge (supplied air respirator hose length no more than manufacturer's specification and under no circumstances greater than 91 m [300 ft]).

  - Chemical-resistant coveralls or encapsulating suit (Tyvek QC®, Tychem 7500®, Saranex 23-C™, or equivalent)

  - Any other chemical or radiological PPE prescribed in site-specific radiological work permit or safe work permit

  - Chemical-resistant butyl or one-time-use natural latex outer boots (as determined by the IH and/or RCT)

  - Inner chemical-resistant nitrile rubber gloves with cotton liners (as determined by the IH and/or RCT)

  - Outer chemical-resistant Viton or PVA gloves (as determined by the IH).

- Optional Level B Modifications include:

  - Radiological modesty garments under outer protective clothing

  - Any specialized protective equipment (hearing protection, welding lens, and aprons).

Note: *All seams must be taped and secured to prevent skin contact from hazardous substances in a soil, liquid, mist, and aerosolized form.*

9.1.4 Level A Personal Protective Equipment

The use of Level A PPE ensemble (fully encapsulating suits) is not anticipated for the OU 5-12 RD/RA project. Level A ensemble must be further evaluated to determine if the safety basis for OU 5-12 RD/RA activities are still valid or if additional safety analysis documentation is required. Prior to selecting Level A PPE, the assigned IH and/or RCT must ensure that site characterization, to identify known and potential chemical and radiological hazards, is completed (to the extent possible).

Level A PPE has the maximum respiratory, skin, and eye protection, and is suitable for use in situations where the levels of contaminants are known to be very high and dangerous, where levels are completely unknown, or where an IDLH condition could develop. Level A PPE includes:

- Level B ensemble with the following respiratory and whole body protection upgrades:
  - Open circuit SCBA or a full-facepiece supplied air respirator with a 15-minute escape-only SCBA bottle operated in a continuous-flow mode (supplied air respirator hose length of less than 91 m [300 ft])
  - Fully encapsulating, chemical-resistant suit (Barricade®, Tychem 10000™, or equivalent)
  - Chemical-resistant butyl or one-time-use natural latex outer boots (as determined by the IH and/or RCT)
  - Inner chemical-resistant nitrile rubber gloves with cotton liners (as determined by the IH and/or RCT)
  - Outer chemical-resistant Viton or PVA gloves (as determined by the IH).
- Optional Level A modifications include:
  - Radiological modesty garments under outer protective clothing
  - Any specialized protective equipment (hearing protection, welding lens, and aprons).

9.2 Protective Clothing Upgrading and Downgrading

The HSO, in consultation with the project IH and RadCon personnel, will be responsible for determining when to upgrade or downgrade PPE requirements. Upgrading or downgrading PPE requirements based on current conditions is a normal occurrence. Possible reasons for upgrading or downgrading include:

- Upgrading Criteria (work will stop immediately if PPE upgrading is required)
  - Unstable or unpredictable site radiological and/or nonradiological hazards

- Contaminants that present difficulty in monitoring or detecting
- Known or suspected presence of skin absorption hazards
- Temporary loss or failure of any engineering controls
- Identified source or potential source of respiratory hazard(s)
- Change in the task procedure that may result in an increased contact with contaminants or meeting any of the criteria listed above.

• Downgrading Criteria

Note: *When downgrading for radiological occurs, a new radiological work permit must be issued.*

- New information of monitoring data that shows the contaminant levels to be lower than established action limits
- Implementation of new engineering or administrative controls that eliminate or significantly mitigate hazards
- Elimination of potential skin absorption or contact hazards
- Change in site conditions that results in removal of physical hazards or reduces/isolates them to a controlled area
- Completion or change in tasks that results in the elimination of key hazards that require higher levels of PPE.

9.3 Inspection of PPE

All PPE ensemble components must be inspected prior to use and when in use within project work zones. Once PPE is donned, self-inspection and the use of the buddy system will serve as the principle forms of inspection. If at any time PPE should become damaged or degradation/permeation is suspected, an individual will inform others of the problem and proceed directly to the work zone exit point to doff and replace the unserviceable equipment. Additionally, all PPE that becomes grossly contaminated or presents a potential source for the spread of such contamination will be required to be decontaminated or replaced. Table 9-2 provides an inspection checklist for common PPE items.

Table 9-2. PPE inspection checklist.

PPE Item	Inspection
Gloves	Before use: • Pressurize gloves to check for pinholes: roll glove until air is trapped and inspect. No air should escape.
Respirators (full-facepiece air-purifying and supplied air respirators with escape-only SCBA bottles or escape cartridges)	Before use: • Airline matches the airline respirator to be used (black hose). • Inspect airline hose connections (sections of hose) to ensure all are threaded or permanent metal-to-metal connections (no quick disconnect pieces). • Check condition of the facepiece, head straps, valves, connecting lines, fittings, all connections for tightness. • Check cartridge to ensure proper type/combination for atmospheric hazards to be encountered, inspect threads and O-rings for pliability, deterioration, and distortion. • Check for proper setting and operation of regulators and valves, check all hose connections back to the breathing air compressor, check the pressure to the airline station, and on individual airline connections to ensure pressure is within required range (in accordance with the manufacturer's specification). Before entry into Level B area: • Ensure air compressor is providing a minimum of 110 psi when all personnel have airlines hooked up to compressor manifold.

Table 9-2. (continued).

PPE Item	Inspection
Airhoods	Before use: • Airline matches the airhood to be used (red hose). • Airhood is within 3-year shelf life (for polyvinyl chloride components). • Visually inspect all seams and surfaces for tears and cracks. • Pressurize air hood to check for pinholes or defective seams (no air should leak out when choking clear hood piece). Before entry into contaminated area: • Inspect all airline connections for tight fit (pull connections 3 times). • Ensure air compressor is providing a minimum of 110 psi when all personnel have airlines hooked up to compressor manifold.
Level D, C, and B clothing	Before use: • Visually inspect for imperfect seams, nonuniform coatings, and tears. Hold PPE up to the light and inspect for pinholes, deterioration, stiffness, and cracks. While wearing in the work zone: • Evidence of chemical attack, such as discoloration, swelling, softening and material degradation. Inspect for tears, punctures, and zipper or seam damage. Check all taped areas to ensure they are still intact.
Level A encapsulating suit	Before use: • Same item as with other protective clothing, with the addition of checking the operation of the pressure relief valve, inspect fitting of wrists, ankles and neck. Inspect face shield for cracks, fogginess, scratches, and crazing. While wearing in the work zone: • Same as other protective clothing.

10. DECONTAMINATION PROCEDURES

Every effort will be made to prevent contamination of personnel and equipment through the use of engineering controls, isolation of source materials, continuous site monitoring and surveying, personnel contamination control training, and by following all contaminated material handling requirements and procedures.

10.1 Contamination Control and Prevention

Everything that enters the established contamination area has the potential of becoming contaminated. Contamination control and prevention procedures will be implemented throughout the project to minimize personnel contact with contaminated surfaces. At the project sites, the following contamination control and prevention measures will be employed:

- Identifying potential sources of contamination and design containment, isolation, and engineering controls to eliminate or mitigate any potential for contact or release of contaminants
- Limiting the number of personnel, equipment, and materials that enter the contaminated area
- If contamination is found on the outer surfaces of equipment, immediate decontamination procedures will be implemented to prevent the spread of contamination (see Section 10.2.3)
- Utilizing only the established control entry and exit point from the contaminated area to minimize the potential for cross-contamination and expedite contamination control surveys
- Wearing disposable outer garments and utilizing disposable equipment (where possible).

10.2 Personnel and Equipment Decontamination

Decontamination procedures for personnel and equipment are necessary to control contamination and protect personnel. Both chemical and radionuclide contamination will be decontaminated from surfaces at the exit from the contaminated area and other work zone transition boundaries (CRZ for nonradiological nonhazardous materials, as appropriate).

All radionuclide decontamination operations for equipment and areas will be performed in accordance with Chapter 4 of the INEEL *Radiation Protection Manual*. Nonradionuclide decontamination will be evaluated on a case-by-case basis by the HSO and project IH to determine the most appropriate PPE (Level C protective clothing will initially be selected until site monitoring can demonstrate downgrading is warranted). Specific personnel and equipment decontamination methods are provided below.

10.2.1 Personnel Decontamination

Engineering controls in conjunction with project contamination prevention and control practices, and proper protective clothing donning and doffing procedures will serve as the primary means to

eliminate the need for personnel decontamination. Procedures for donning and doffing protective clothing will be posted at the entrance and exit to all radionuclide contamination areas established. Prior to donning PPE, all items will be inspected. Following the donning of protective clothing, your buddy, the CC, HSO, and/or RCT will check to verify proper donning technique. The greatest potential for personnel contamination exists from improper doffing of contaminated protective equipment (during a containment failure scenario only) when exiting a contaminated area.

The PPE selection, as identified in the radiological work permit/safe work permit, will provide for the layered barriers required, preventing permeation and minimizing external surface contamination. The options for the outermost protective clothing layer (Tyvek QC® and Saranex-23C™) will depend on the likelihood for deposition of contaminants and the specific tasks.

10.2.2 Decontamination in Medical Emergencies

If a person is injured or becomes ill, first-aid-trained personnel at the project task site will immediately evaluate him/her. If the injury or illness is serious, the FTL or CC will contact the Warning Communications Center (WCC) to summon emergency services (Fire Department and Central Facilities Area Medical) to the site.

Medical care for serious injury or illness will not be delayed for decontamination. In such cases, gross decontamination may be conducted by removing the injured person's outer protective clothing (if possible) and other contaminated areas contained with a bag or glove. If contaminated PPE cannot be removed without causing further injury (except for the respirator, which must be removed), the individual will be wrapped in plastic, blankets or available material to help prevent contaminating the inside of the ambulance, medical equipment and medical personnel. The IH and/or RCT (depending on the type of contamination) will accompany the employee to the medical facility to provide information and decontamination assistance to medical personnel. Contaminated PPE will then be removed at the Central Facilities Area medical facility and carefully handled to prevent the spread of contamination. The INEEL *Radiation Protection Manual,* Chapter 5, and MCP-148, "Personnel Decontamination," contains information on proper handling of radionuclide-contaminated wounds.

10.2.3 Equipment Decontamination

Containment engineering and isolation controls will be used to prevent contamination from waste. These engineering controls will serve to isolate and eliminate or mitigate many of the potential contamination pathways to prevent equipment contamination and greatly reduce the need for decontamination. Project IH and RadCon personnel will conduct surveys and collect swipes in accordance with the technical procedures (TPRs) to evaluate engineering controls, material handling methods, and containment integrity.

Both real-time instrumentation and visual observation will be used to detect contamination. Equipment and personnel decontamination will use both instrumentation and visual methods for contamination detection and to minimize the potential spread and airborne generation of contaminants. Where radiological and IH concerns do not prohibit their use, TPR-51, "Decontamination of Heavy Equipment in the Field," and TPR-52, "Decontamination of Sampling Equipment in the Field," will be followed. The RadCon and IH personnel will evaluate any contaminated equipment to determine the most appropriate decontamination method based on the nature of the contaminated item, level of contamination, required effort to decontaminate the item, and requirement for decontaminating versus disposing of such items. In some cases, the level of effort and potential for spreading contamination from conducting decontamination tasks far outweigh the benefit from engaging in extensive decontamination efforts to return an item to service. A cost-ALARA versus benefit evaluation will be done on items that

have extensive contamination or are relatively inexpensive. Low-cost consumable items will be discarded if initial decontamination efforts fail or extensive decontamination is required that is not in accordance with ALARA principles.

One of the radionuclide-decontamination goals is to not generate any free liquid. By using dry decontamination techniques (HEPA vacuum and adhesive tape) and avoiding radiological instrument shielding problems from the use of liquid washing methods, the likelihood of spreading contamination will be eliminated. A nonradionuclide-decontamination pad may be established if it is believed that residual nonradionuclide contamination is present on equipment following release from the contaminated area. For nonradionuclide decontamination of free released equipment, a decontamination pad may be established in the CRC. If it is deemed necessary and appropriate by the project IH, then a wet wiping with the aforementioned amended water solution or potentially steam cleaning of this equipment prior to leaving the CRC may be conducted. If steam cleaning is performed, a drainage system that allows for a single collection point will be established. Decontamination wastewater will be collected using a submergible pump and containerized/characterized in accordance with the INEEL *Environmental Management Procedures Manual* at the direction of Waste Generator Services representative.

10.3 Doffing PPE and Decontamination

The proposed decontamination strategy takes into account the most restrictive radiological practices (removable alpha contamination) and allowances for chemical contaminants that may be present. Some preliminary surface decontamination of protective clothing may be required if they are grossly contaminated and the potential for the generation of airborne radioactivity or organic vapor emissions exists. This will involve assistance from other personnel inside the contamination area and at the doffing station (as described below). The ultimate goal of all decontamination methods is to effectively and efficiently isolate the source of contamination through removal of protective clothing and containment in a sealed bag or waste container.

The exact sequence and specific techniques that follow are provided as the initial method at the site. If site conditions change or at the discretion of the project RE, modifications to this procedure are appropriate. However, the HSO and IH must also evaluate any modification. Both radiological and nonradiological (chemical) hazards will be evaluated.

10.3.1 Level B and C PPE Decontamination (Double Step-off Pads)

When Level B or C PPE are worn, two step-off pads may be used at the task site: one at the line between the contaminated area and step-off Pad 1 and the second at the line between step-off Pad 1 and step-off Pad 2. These may both be within the EZ. Any gross contamination identified (visually and during normal monitoring) will be covered with tape and plastic or decontaminated (HEPA vacuum, spray/wipe, or combination of both) prior to entering step-off Pad 1 to minimize the spread of contamination.

10.3.1.1 Contamination Area. Initial decontamination is accomplished through removing the outer set of protective clothing (Anti-Cs of appropriate material), along with supplemental dosimetry, following the posted sequence. Doffing of the outer set of protective clothing will occur at the exit to the contaminated area. Prior to entering the step-off Pad 1 area, personnel will leave all tools and equipment inside the contaminated area (bagged as required) and remove the outer most layer of clothing (third layer), gloves and shoe covers (scuffs) and place them in the provided receptacles. Personnel will then proceed to step-off Pad 1 with their respiratory protection (air hood) still on and the airline connected.

10.3.1.2 Step-Off Pad 1. Step-off Pad 1 is designed to support personnel exiting the contaminated area and serves as a radiologically-controlled area to complete the doffing sequences. Personnel will remove the inner layer of protective clothing and disconnect/remove air hoods in step-off Pad 1. Airline hose connections will then be sealed by covering the ends with a latex glove and tape, and placing it in a RadCon survey box located adjacent to step-off Pad 1.

An air-monitoring inlet will be located inside the step-off Pad 1 area to monitor for airborne radioactivity and ensure respiratory protection can safely be removed. Following prescribed step-off Pad 1 doffing, personnel will then proceed to step-off Pad 2.

10.3.1.3 Step-Off Pad 2. The step-off Pad 2 serves as the final step-off pad and all PPE will be removed as personnel cross over into step-off Pad 2. While inside step-off Pad 1 (with only the inner gloves and booties on) personnel will remove the remaining PPE items and step across the line into the step-off Pad 2 (one foot at a time as posted). All personnel will then be required to complete a whole body survey with a hand-held radiation detection instrument (as listed in Table 8-6) while in step-off Pad 2. The sequence for this survey is detailed in Section 10.3.2.

10.3.1.4 Radiological Buffer Area. The RBA serves as the radiologically controlled area around the entire site contaminated area that provides a secondary boundary to minimize the potential spread of contamination.

10.3.2 Personnel Radiological Contamination Monitoring

All personnel inside the step-off Pad 2 will conduct a whole body radiological contamination survey immediately following the doffing procedure listed above. The RadCon personnel may perform this survey or a self-survey may be required. The RadCon personnel, based on the type and level of contamination, will determine the specific model and type of monitoring instruments.

10.4 Disposal of Contaminated PPE and Equipment

10.4.1 Storage and Disposal of Contaminated Materials

The potential exists for the generation of waste from project activities. Sources of this waste may include:

- Used PPE (protective clothing, gloves, booties, and respirators)
- Small tools and equipment that cannot or will not be decontaminated/released
- Used core sections from the core sampling task
- Radiologically controlled area materials (step-off pads, bags, swipes, plastic sheeting)
- Decontamination waste (wipes and bags)
- Miscellaneous debris that cannot be released (Lexan, caps, and lines).

Waste Generator Services (WGS) will provide direction on all waste management issues. Equipment that cannot be decontaminated will be bagged, labeled, and placed in containers. The Waste

Management Section of the project Field Sampling and Analysis Plan provides a description on how this material will be characterized, managed, and disposed of.

10.4.2 Site Sanitation and Waste Minimization

Toilet facilities, potable water, and soap will be available at the site for personnel to use upon exiting the work area. It is important to note that any required radionuclide contamination surveys must be performed before washing the face and hands to prevent accidental spread of contamination.

Waste materials will not be allowed to accumulate at the task site. Appropriate containers for contaminated and noncontaminated waste will be maintained at step-off areas, in the SZ, and at other appropriate locations at the task site. Personnel should make every attempt to minimize waste through judicious use of consumable materials. All site personnel are expected to make good housekeeping a priority at the job site.

11. EMERGENCY RESPONSE PLAN FOR OU 5-12 RD/RA PROJECT SITES

This section defines the responsibilities of the project and the INEEL ERO by providing guidance for responding to abnormal events during project activity.

This emergency response plan addresses OSHA "emergency response" as defined by 29 CFR 1910.120/1926.65, "Hazardous Waste Operations and Emergency Response," and DOE "emergencies" as defined by DOE Order 151.1, Change 2, "DOE Comprehensive Emergency Management System," and DOE Order 232.1, "Occurrence Reporting and Processing of Operations Information." This response plan is implemented in concert with Plan (PLN)-114, "INEEL Emergency Plan/Resource Conservation and Recovery Act Contingency Plan."

The INEEL Emergency Plan/RCRA Contingency Plan may be activated in response to events occurring at the Site, or at the discretion of the emergency coordinator (EC)/emergency action manager (EAM). Once the INEEL plan is activated, project personnel will follow the direction and guidance communicated by the EC.

Note: *The OSHA term "emergency" is not defined the same as the DOE term "emergency." For simplicity, the term "emergency" is used in this section of the HASP to refer to events covered by either the OSHA or the DOE definition.*

Preplanning makes it possible for the project to anticipate and appropriately respond to abnormal events that can affect project activity. Preplanning also ensures that the project emergency response program is integrated with that of the INEEL. Emergency response program elements that must be completed before starting the project include:

- Designating emergency warning signals and evacuation routes
- Implementing personnel accountability procedures
- Identifying emergency medical services and the personnel charged with performing those services
- Establishing effective site communications
- Establishing requirements for emergency equipment and supplies
- Establishing the preferred means for notifying the INEEL ERO of abnormal events.

All emergencies will be reported through the Central Facilities Area (CFA) or PBF Site Area Director or the WCC to the PBF ERO for classification in accordance with Section 4 of the INEEL Emergency Plan/RCRA Contingency Plan (PLN-114). If the CFA WCC or the PBF ERO is activated, site emergency response will follow the INEEL Emergency Plan/RCRA Contingency Plan.

On scene response to and mitigation of site emergencies could require the expertise of both site personnel and INEEL Fire Department (FD) personnel. Emergencies that could occur include:

- Accidents resulting in injury
- Accidents resulting in radiological exposure
- Fires
- Explosions
- Spills of hazardous/radiological materials
- Tornadoes, earthquakes, and other adverse natural phenomena
- Vehicle or transportation emergencies
- Safeguard and security emergencies
- Emergencies at nearby facilities that could prompt evacuation or take-cover actions at the task site.

11.1 Types of Emergency Events

Note: *This HASP addresses three types of emergency events as described in the following sections.*

11.1.1 Events Requiring Emergency Notifications

Certain events require courtesy notifications, but do not require a response from the INEEL ERO. In these cases, the project FTL or designee will immediately notify the applicable CFA or PBF Site Area Director, WCC, BBWI/subcontractor project and department personnel, DOE, and other appropriate parties as listed in Section 11.8. The FTL's notification should describe the event (see Section 11.5) and state that no emergency response support is required. Examples of these types of events include, but are not limited to, the following:

- Personal injury at the site requiring medical evaluation or treatment, but does not require an ambulance response
- Personnel contamination or suspected uptake of radiological or hazardous substance
- Equipment or vehicle accident that results in damage to the vehicle and/or property ONLY
- Failure of an engineering control or isolation that results in only localized contamination within the established radiologically controlled area
- Unexpected high radiation dose to personnel (>ALARA goal)

- Small fire that is controlled with a hand-held fire extinguisher
- Any spill as defined by MCP-439, "Facility Notification and Release Reporting"
- Any other deemed potentially reportable.

11.1.2 Events Requiring Local Project Evacuation and/or INEEL ERO Response

Some events that could occur at the project sites may require support from the INEEL ERO or may require a local area evacuation of the project. In these cases, the project FTL or designee, who is the appointed project area warden, will immediately notify the applicable CFA or PBF Site Area Director, the WCC, BBWI/subcontractor project and department personnel, DOE, and other appropriate parties as listed in Section 11.9. The FTL's notification will describe the event (see Section 11.5) and will request emergency response resources as appropriate. After being informed of the event, the EC/EAM may elect to activate the facility command post/emergency control center. Once the command post/emergency control center is declared operational, all emergency response activities will be coordinated through the EC/EAM. The specific actions to be taken in response to emergency alarms are described in Section 11.5. Examples of these types of events include, but are not limited to, those listed below:

- Fire that is burning beyond an incipient stage and cannot be extinguished with hand-held extinguishers
- Large spill at the project that cannot be immediately contained or controlled
- Small episodic airborne release beyond the radiologically controlled area
- Serious injury to a worker or workers.

11.1.3 Events Requiring Total Facility and Project Evacuation

In the event that a facility evacuation requires the project to evacuate, the FTL or designee will be notified to evacuate all project personnel. The EC/EAM is responsible for ordering a total area evacuation protective action.

Note: *When an evacuation is called for by the EC/EAM, the FTL is the designated project area warden who will ensure that the ERO personnel accountability leader has been notified that all project employees have been evacuated and accounted for.*

11.2 Emergency Facilities and Equipment

Emergency response equipment that will be maintained at each site includes the items described in the applicable project-specific appendix. In addition, Section 11 of the INEEL Emergency Plan lists all INEEL emergency equipment available. The INEEL FD maintains an emergency hazardous materials (HAZMAT) response van that can be used to respond to an event or emergency at the project. Fire department personnel are also trained to provide immediate hazardous material spills and medical services. At least two personnel with current medic/first-aid training will be present at the project to render first aid as required.

Project RadCon and IH personnel will assist with all emergency decontamination efforts. If an emergency at the site involves a temporary accumulation area, refer to the INEEL Emergency Plan/RCRA Contingency Plan, Appendix L for emergency equipment inventory information.

11.3 Emergency Communications

In the event of an emergency, the capability to summon INEEL emergency response resources, to immediately notify site personnel, and to inform others of site emergencies is required. Communications equipment at the task site will be a combination of pagers, radio (call sign "KID 240" or talk group "INEL OSC"), and/or telephones (mobile, cellular, or facility).

Note: *When trunk units are used, the response organization can be reached via AINELOSC@ (the talk group).*

The following, as necessary, will be used for emergency situations:

- To get help from the INEEL FD, site personnel will use radio communications, call 777, OR 526-1515. INEEL facility telephones are linked to 777. Use *777 on INEEL mobile or cellular telephones or go through the INEEL WCC at 526-1515.
- Verbal communication, radios, or cell phones will be used to notify site personnel to stop work and evacuate the site.
- Verbal communication, radios, or cell phones will be used to notify site personnel to stop work and take cover.
- For sites that are located in the field (i.e., inside the INEEL boundary but outside of any specific facility boundaries), the point of contact will be the FTL or HSO. The point of contact maintains communications with fieldworkers at all times and can notify fieldworkers of facility or Site-wide emergencies that could impact the task site.
- The applicable CFA or PBF Site Area Director or facility manager will be notified.
- The CFA or PBF Site Area Director/Facility Manager or the WCC will notify the CFA or PBF EC, as applicable.
- Site personnel will provide the following information, as available, when communicating emergency information to the INEEL site emergency telephone number, the WCC, or the point of contact:
- The caller's name, telephone number, pager number
- Exact location of the emergency
- Nature of the emergency including time of occurrence, current site conditions, and special hazards in the area
- Injuries, if any, including number of injured, types of injuries, conditions of injured
- Additional information as requested.

11.4 Emergency Response Roles and Responsibilities

11.4.1 INEEL Emergency Response Organizations

The INEEL ERO structure is based on the Incident Command System (ICS). The ICS is an emergency management system designed for use from the time an incident occurs and is responded to until it is terminated. The system consists of procedures for controlling personnel, facilities, equipment, and communications. It allows for activating emergency response resources in a grade approach depending on the nature and seriousness of the event. The ICS is implemented as a chain of command operating on three basic levels. They consist of (1) on-scene-commander (OSC), (2) Command Post/Emergency Control Center, and (3) INEEL Emergency Operations Center.

11.4.1.1 On-Scene Commander. The OSC (per PLN-114, Emergency Control Organization) has the tactical and command responsibility for the control of an emergency situation at the scene, a fire, hazardous material response, and as a special rescue response. The senior FD officer responding for the INEEL FD fills this position. If the event is primarily a security incident, the senior responding protective forces officer will assume the duties of the OSC. In some instances, the incident response team leader (IRTL) may function as the OSC until relieved by a higher-tiered authority. The IRTL reports to the OSC who reports to the EC/EAM. The Incident Response Team acts at the first responder awareness level by providing initial control, personal protective measures, and incident assessment and mitigation as directed by the IRTL.

The project FTL and HSO, as well as a designated replacement, will be trained at the first responder awareness level and will take immediate actions to:

- Understand the potential outcomes associated with an emergency when hazardous substances are present
- Understand what hazardous substances are and the risks associated with them in an incident
- Recognize the presence of hazardous substances in an emergency
- Identify the hazardous substances if possible
- Perform the roles of a first responder at the awareness level
- Realize and understand the need for additional resources.

11.4.1.2 Command Post/Emergency Control Center. The Command Post/Emergency Control Center is the second tier of the emergency response line organization and is headed by the EC/EAM. The EC/EAM is responsible for all emergency response actions within the entire facility, including advising the OSC. The Command Post/Emergency Control Center is activated for actual or potential emergencies or at the direction of the EC/EAM. If the Command Post/Emergency Control Center is activated in response to an event at the project, then the project will send a representative to the Command Post/Emergency Control Center to advise the EC/EAM.

11.4.1.3 Emergency Operations Center. The Emergency Operations Center is the upper tier of the ERO and is headed by the INEEL Emergency Director. The Emergency Director is responsible for all

emergency response actions at the INEEL, including advising the EC/EAM. Project personnel do not normally provide direct support to the Emergency Operations Center.

11.4.2 Project Personnel Involved in Emergencies

11.4.2.1 Field Team Leader. The FTL or the HSO is responsible, as the designated project first responder at the awareness level, for initiating all requests for emergency services (fire and medical) and for notifying the facility Site Area Director of abnormal or potential abnormal events occurring on the project. The FTL, or designee, serves as the project area warden. The FTL in this capacity will report the accountability for all employees when an emergency evacuation is called to the Personnel Accountability Leader. Additionally, the FTL will control the scene at the first responder awareness level until a higher-tiered ICS authority arrives at the scene to take control as the OSC (see Section 11.4.1.1). While maintaining control of the scene from a protected, controlled distance, the FTL will maintain communication with the facility Shift Supervisor/Site Area Director or the EC/EAM when the system is in place.

11.4.2.2 Project Personnel. Every person at the project has a role to play during an event or INEEL emergency. Each employee must be constantly aware of potential problems or unexpectedly hazardous situations by immediately reporting these situations to the FTL or HSO. All employees are expected to watch out for their fellow workers, to report their concerns to the FTL, and to respond to emergency events as provided for in this HASP. Specific project personnel responsibilities are outlined in Table 11-1.

11.5 Emergencies, Recognition of Warnings, and Response

11.5.1 Emergency Recognition and Response

All site personnel should be constantly alert for signs of potentially hazardous situations including signs and symptoms of chemical or radiological exposures or releases. Site personnel will be trained on the methods, signals, and alarms.

- For an evacuation or a take cover alert at ARA or PBF, site personnel will follow CFA or PBF Evacuation or Take Cover alarms (see applicable appendix for take-cover procedures).
- For assistance from the INEEL FD, site personnel will use radio communication or call 777 OR 526-1515.
- At least two people with current medic/first aid training will be present at the task site to render first aid. For serious injury, assistance from the INEEL FD will be summoned. All occupational injuries/illnesses will be reported promptly to the INEEL OMP.
- For fires that cannot be handled with hand-held extinguishers, assistance from the INEEL FD will be summoned. All fires of any size will be reported promptly to the INEEL FD, even if site personnel have extinguished the fire.
- For spills of hazardous/radiological material, site personnel will not expose themselves to hazardous conditions beyond their training and qualification for HAZWOPER. If abnormal radiological situations are present, then MCP-124, "Response to Abnormal Radiological Situations," will be followed.

Table 11-1. Responsibilities during an emergency.

Responsible Person	Action assigned
FTL or designee	Contact the INEEL site emergency telephone number or the Warning Communications Center
FTL or designee	Signal evacuation or take-cover
FTL or designee	Act as point of contact
FTL, HSO, or CC	Provide first aid
FTL, HSO, or CC	Report occupational injuries/illnesses to the Occupational Medical Program
Trained project personnel	Extinguish fires (incipient fires only and only when it is safe to attempt)
FTL, HSO, or CC	Report fires to the INEEL fire department
Trained project personnel	Contain spills (within level of training) and report spill to FTL, CC, or HSO
FTL, HSO, or CC	Report spills to the INEEL Spill Notification Team
FTL or HSO	Assemble Industrial Safety/Industrial Hygiene/RadCon team
FTL or designee	Contact the Site Area Director or Facility Manager
Site Area Director or Facility Manager	Contact the EAM or the EC

- For large spills, assistance from the INEEL FD will be summoned. All spills will be reported promptly to the INEEL Spill Notification Team at pager #6400.

- If spills are small enough to be safely contained at the site, spill control will be handled by site personnel, who will take the following immediate spill response actions:

- Untrained site personnel (or if the material characteristics are unknown) will:

  - Evacuate and isolate the immediate area

  - Seek help from and warn others in the area

  - Notify the FTL , CC and the HSO.

- Trained site first responders at the awareness level will:

  - Seek help from and warn others in the area

  - Stop the spill, if it can be done without risk (e.g., return the container to the upright position, close valve, and shut off power)

  - Provide pertinent information to the FTL, CC or the HSO

  - Secure any ventilation paths and ensure that a RCT surveys the area to determine the extent of a radiological material spill and/or an IH surveys the area to determine the extent of a chemical spill.

The nearest INEEL fire station is located at CFA. Fire department personnel have response capabilities for first aid, medical emergencies, transport, fires, and hazardous material spills. Figure 11-1 shows the route to the nearest medical facility, locations of nearby fire stations, site and facility evacuation routes, and evacuation pickup locations.

Responsibilities during an emergency at the site are shown in Table 11-1.

An emergency drill will be conducted at the start of project activity. The purpose of the drill is to familiarize employees with their respective emergency response actions. Additional drills may be conducted at the discretion of the project. Any radio or telephone communications that are included in drills will be immediately preceded and followed with the statement that "This is a drill." Each drill or actual emergency at the task site will be followed by a critique, and any deficiencies that are identified in the response plan, procedures, or actions will be corrected.

11.5.2 Alarms

Alarms and signals are used at the INEEL to notify personnel of abnormal conditions that require a specific response. These include radiation-monitoring alarms denoted by fast ringing bells and fire alarms, which vary from building to building. Responses to these alarms are addressed in the general employee training. In addition to the alarms previously described, emergency sirens located throughout the INEEL serve as the primary means for signaling emergency TAKE COVER or EVACUATION protective actions. To better ensure personnel safety, the project has established a separate system of emergency signals based on hand-held air horns. These signals are described in Table 11-2. Actions to be taken by project personnel in response to TAKE COVER and EVACUATION alarms are described next.

11.5.2.1 Take Cover. Radiation or hazardous material releases, weather conditions, or other event or emergency conditions may require that all personnel take cover indoors in the nearest building. A TAKE COVER protective action may be initiated as part of a broader response to an emergency situation and may precede an evacuation order. The order to TAKE COVER is usually announced by activating the emergency siren. The signal to take cover is a CONTINUOUS SIREN that can be heard throughout the area. Remember, STEADY = STAY. But, the order to take cover can also be given by word of mouth, radio, local air horn (per Table 11-2), or voice paging system. When ordered to TAKE COVER, project personnel will place the site in a safe condition (as appropriate) and then seek shelter in the nearest available building. Vehicles may be used for shelter if there are no buildings nearby. Eating, drinking, and smoking are not permitted during take cover conditions.

Project RadCon, IH, and HSO personnel will assist and direct all workers exiting from radionuclide contamination areas during a TAKE COVER alarm.

11.5.2.2 Total Area Evacuation. A total area evacuation is the complete withdrawal of personnel from the Site. The evacuation signal is an ALTERNATING SIREN. Remember, ALTERNATE = EVACUATE. A single long blast of the air horn serves as the project's alternate emergency evacuation alarm. But, the order to evacuate can also be given by word of mouth, radio, or voice paging system. When ordered to EVACUATE, project personnel will place the site in a safe condition (as appropriate) and then proceed along the specified evacuation route to the designated assembly area or as directed by the EC. Eating, drinking, and smoking are not permitted during emergency evacuations.

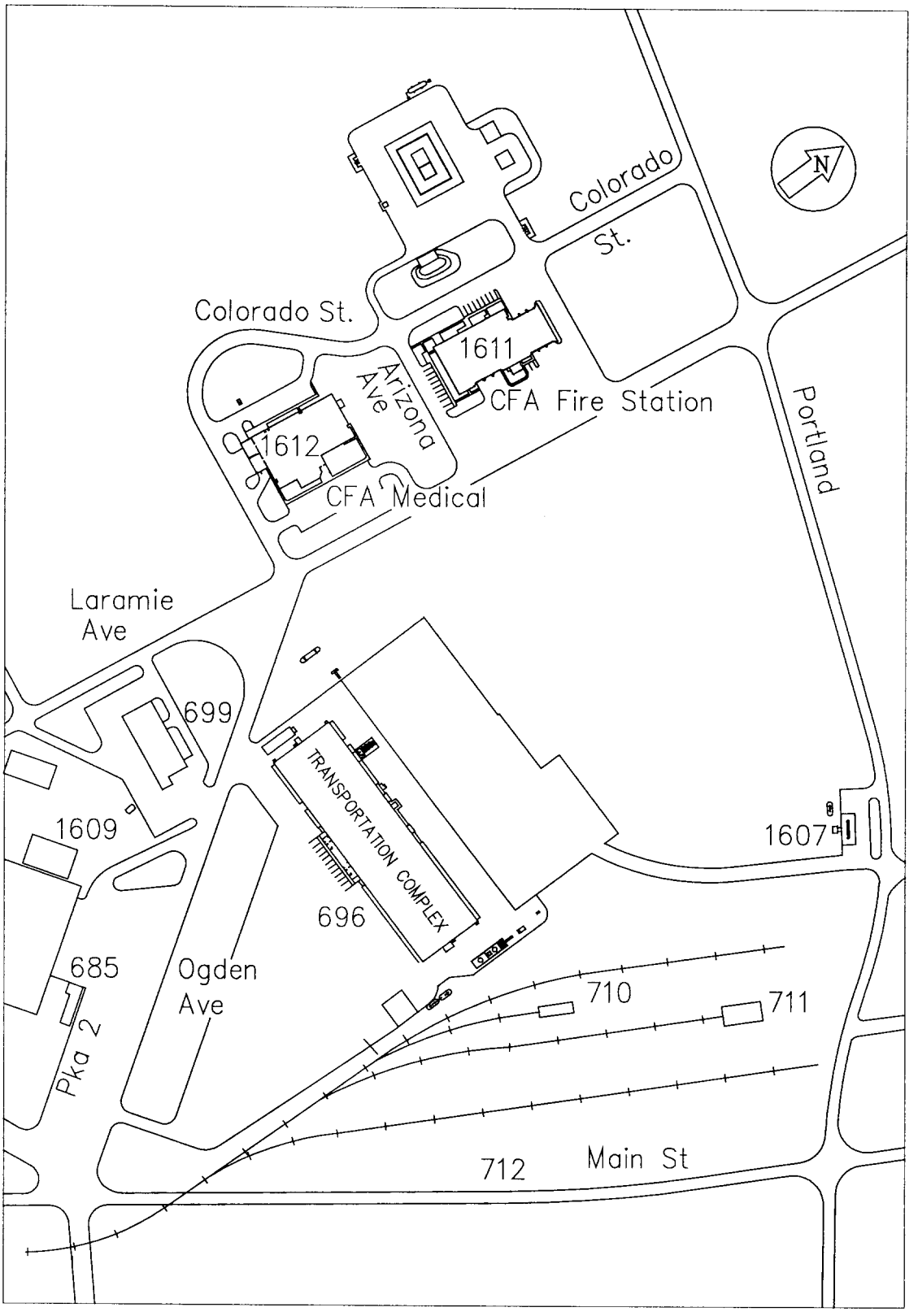

Figure 11-1. Map showing the route to the nearest medical facility, CFA-1612; location of nearby INEEL fire station, CFA-1612; site and facility evacuation routes; and evacuation pickup locations.

Project RadCon, IH, and HSO personnel will assist and direct all workers exiting from radionuclide contamination areas during an EVACUATION alarm.

11.5.2.3 Local Area Evacuation. A local area evacuation is the complete withdrawal of personnel from the Site, but it does not require the complete evacuation of the area. A single long blast of the air horn can be used as the project's emergency evacuation alarm (per Table 11-2). But, the order to evacuate, can also be given by word of mouth, radio, or voice paging system. When ordered to evacuate, the local area project personnel will place the site in a safe condition (as appropriate) and then proceed along the specified evacuation route to the assembly area designated for local area evacuations, or as directed by the FTL. Eating, drinking, and smoking are not permitted during emergency evacuations.

Project RadCon, IH, and HSO personnel will assist and direct all workers exiting from radionuclide contamination areas during a evacuation alarm.

11.5.3 Personnel Accountability/Area Warden

Project personnel are required to respond in an appropriate manner to TAKE COVER, EVACUATION, and local evacuation alarms. In each case, the project area warden will account for the people present on the site at the time the alarm was initiated. The FTL or designee serves as the area warden for the project and completes the personnel accountability based on the sign-in roster used to control site access. As described next, the method used to report the results of the accountability process varies depending on the nature of the emergency event.

For total area evacuations, the applicable CFA or PBF Command Post/Emergency Control Center is activated and all personnel gather at the evacuation assembly area designated by the EC/EAM. In this situation, the project area warden reports the result of the accountability process to the personnel accountability leader.

The CFA or PBF Command Post/Emergency Control Center is also activated for TAKE COVER alarms; however, personnel remain in the closest appropriate shelter. In this situation, a complete personnel accountability report is not required, but the project area warden should report the results of the accountability process to the CFA or PBF Command Post/Emergency Control Center for the information of the EC/EAM.

The CFA or PBF Command Post/Emergency Control Center may not be activated for a Site local area evacuation. In this situation, a complete personnel accountability report is not required, but the project area warden should report the results of the accountability process to the PBF or CFA Shift Supervisor (SS) for the information of the facility manager.

Table 11-2. Project internal and backup emergency air-horn signals.

Device or Communication Method	Signal and Associated Response	
Air Horns (blasts)	One Long Blast	Emergency evacuation, as stated above.
	Two Short Blasts	Nonemergency evacuation of immediate work area as stated above. Proceed to project assembly area.
	Three Long Blasts	All clear, return to Site.

11.5.4 Notifications

As directed by the office of the Secretary of Energy, the area director is responsible for immediately notifying the DOE and local off-Site agencies of all significant abnormal events that occur. This duty is in addition to the notification requirements established in INEEL procedures for events that are categorized as emergencies or unusual occurrences. For this reason, the project will immediately report all abnormal events that occur on the Site to the Site Area Director and to the WCC. The WCC will, in turn, notify the appropriate INEEL emergency response resources and other INEEL facilities (as appropriate). The Site Area Director and the WCC share the responsibility for notifying the facility manager, EC/EAM, and area director (as appropriate). Normally, the FTL is responsible for making the event notifications described above. The FTL may make additional notifications as listed in Subsection 11.9 at the discretion of project supervision.

The EC/EAM is the single point of contact between the project and the INEEL ERO and off-Site (off-INEEL) people or agencies. The EC will make all off-Site notifications and all media requests concerned. Table 11-3 lists project notification responsibilities.

11.5.5 Evacuation Routes

Primary and secondary evacuation routes are maintained (Figure 11-1). These routes may be used in response to a total area evacuation as directed by the EC. Copies of the evacuation routes will be posted at the site.

Table 11-3. Project notification responsibilities.

Activity	Title	Phone	Pager	Radio
Field Team Leader				
Notifies	Fire Department	777	—	KID 240
Notifies	Warning Communication Center (WCC)	6-1515	—	KID 240
Notifies	PBF Site Area Director	6-9523	—	—
Notifies	CFA Site Area Director	6-5329	—	—
Notifies	For spills: Environmental Affairs Spill Team	—	6400	—
Notifies	WAG 5 Department Manager	6-8507	6696	—
WAG 5 Department Manager				
Notifies	ER Director	6-2945	9253	—
Notifies	ER ES&H/QA Manager	6-9566	5689	—

11.6 Reentry and Recovery

11.6.1 Reentry

During an emergency response, it is sometimes necessary to reenter the scene of the event. Reasons for performing reentries may include the following:

- Personnel search and rescues
- Medical first aid responses
- Safe shutdown actions
- Mitigating actions
- Evaluate and prepare damage reports
- Radiation and/or hazardous material surveys.

Reentries will be carefully planned to ensure that personnel are protected from harm and to prevent initiating another emergency event. Reentry planning is undertaken as a graded approach depending on the nature of the initiating event.

11.6.2 Recovery

After the initial corrective actions have been taken and effective control is established, response efforts will shift toward recovery. Recovery is the process of assessing post-event/emergency conditions and developing a plan for returning to pre-event/emergency conditions, when possible, and following the plan to completion. The EC/EAM is responsible for determining when an emergency situation is sufficiently stable to terminate the emergency and enter the recovery phase. The facility manager will appoint the recovery manager.

11.7 Critique of Response and Followup

A review and critique will be conducted following all emergency events, drills, and exercises at the INEEL. In some cases, an investigation may be required prior to commencing recovery actions. For this reason, care should be exercised to preserve evidence.

11.8 Notification Responsibilities

Table 11-4 is the reference list that will be posted at each SZ and will also be provided to the offices of those assigned notification responsibilities.

Table 11-4. WAG 5 Emergency Contact List.

Contact Title	Contact Name	Phone Number/Radio Net	Pager Number
Warning Communications Center (WCC)	—	777, 6-1515, KID-240"	—
Fire/Security	—	777	—
PBF Site Area Director	M. Tiernan	6-9523	6692
CFA Site Area Director	V. Catania	6-5329	9263
PBF ESH&Q Manager	T. Carlson	6-8062	5724
CFA ESH&Q Manager	R. MacFarlane	6-8205	5712
First Aid (CFA Medical Dispensary, CFA-1612)	—	777, 6-2356	—
Occupational Medical Program	—	6-1596	—
ER WAG 5 Project Manager	S. G. Wilkinson	6-4150	9481
ER WAG 5 Project Engineer	D. Preussner	6-4818	6825
ER WAG 5 Assistant Project Manager	C. Hiaring	6-2719	6333
ER WAG 5 HSO	K. Briar	6-5214	6627
ER WAG 5 Radiological Control Office	CFA RadCon Office	6-2558	6072
ER WAG 5 Industrial Hygiene	J. Roberts	6-5386	3351
Field Team Leader (FTL)	TBD	—	—
ER Environmental Compliance	K. Davis	6-4949	—
ER WAG 5 Safety Engineer	K. Briar	6-5214	6627
ER Director	F. L. Smith	6-2945	9253
CFA Industrial Safety	G. Horner	6-1979	6565
ER S&H/QA Manager	C. R. Chebul	6-9566	5689

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